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ABSTRACT

The manual is intended to help parents and professionals understand the motor development of Down's syndrome infants and young children. Following an overview of motor development, gross and fine motor landmarks are presented along with exercises and activities to promote their development in infancy, toddlerhood, and childhood. Each landmark is described in terms of developmental age for normal and Down's children. Illustrations are provided along with lists of suggested activities. Appendixes include information on the developmental progression of specific gross and fine motor skills, sequenced activities to develop each terminal landmark, and resources (associations, periodicals, parent groups, books, and pamphlets). (CL)

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MOTOR DEVELOPMENT OF DOWN SYNDROME CHILDREN: BIRTH TO SIX YEARS

AN ILLUSTRATED BOOK

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TABLE OF CONTENTS

Page

Preface iii

Forward v

Acknowledgements vii

Chapter

1. OVERVIEW

A. Introduction 1

B. Down Syndrome Early Motor Development 2

C. Down Syndrome Child and Adolescent Motor Development 4

D. Down Syndrome Adult Motor Skills 6

E. Drug Therapies and Development 7

F. Summary 8

G. References 10

2. HOW TO USE BOOK

A. Introduction 16

B. Guidelines for Teaching 18

3. FINE AND GROSS MOTOR LANDMARKS WITH ACCOMPANYING EXERCISES AND ACTIVITIES

A. Infancy 21

B. Toddlerhood 48

C. Childhood 63

Appendices

A. The Developmental Progression of Specific Motor Skills

1. Gross Motor 86

2. Fine Motor 90

Table of Contents (continued)

Page

B. Sequenced Activities to Develop Each Terminal Landmark

1. Gross Motor 93

2. Fine Motor 115

C. National Resources

1. General Resources in the Area of Mental Retardation 127

2. Resources in the Area of Down Syndrome 128

3. Resources in the Area of Special Physical Education 129

D. National Periodicals

1. General Periodicals in the Area of Mental Retardation 131

2. Periodicals in the Area of Down Syndrome 133

E. Down Syndrome Parent Groups 135

F. Sources for Educational Materials and Equipment 138

G. Books and Pamphlets

1. General Books and Pamphlets in the Area of Mental Retardation 143

2. Books, Articles, and Pamphlets in the Area of Down Syndrome 147

3. Books in the Area of Physical Education 150

4. Books and Pamphlets in the Area of Special Physical Education 152

5. Books and Pamphlets in the Area of Inexpensive and Homemade Physical Education Equipment 155

PREFACE

Many problems confront the parents of a Down Syndrome child. They seem to have developed from uncertainty as to what can reasonably be expected from themselves and the child, as well as inadequate support and guidance on how to follow through with a positive program of training and education. This is particularly evident in the area of Motor Development.

For many years it was thought that a "typical" Down Syndrome children was unable to accomplish such developmental landmarks as walking, talking, toilet training, etc., until well after his/her fifth birthday. It has now been well established that these children are able to accomplish these tasks at a much earlier age. Furthermore, there appears to be a pattern of developmental landmarks which is similar to that of normal children; the only difference is that they progress at a slower rate.

The writing of this book was prompted by questions and concerns from parents of Down Syndrome children. Such questions as "What is my child's physical potential?" "What is my child's optimal motor functioning?" "When will my child creep and crawl?" "Will my child be able to walk?" Until recently, such questions remained difficult to answer.

When there is an observable pattern of growth there is potential for prediction. Optimal development can only be achieved as a result of optimal stimulation of potential capabilities.

This book was written with the hope of answering some questions and reducing accompanying anxieties specifically related to motor development expectations. Based on extensive studies conducted in the United States, New Zealand, and

Mexico, selected fine and gross motor landmarks of Down Syndrome and normal children are presented. Specific exercises and activities are illustrated which may enhance the development of each Motor Landmark.

Motor Landmarks of Down Syndrome children are presented as guidelines for development rather than set or fixed stages. It may well be that Down Syndrome children raised in an "optimal environment" will achieve landmarks at an earlier age.

The Landmarks should not place limits on a given child, as each normal and special child differs; rather, they should provide information and encouragement that the Down Syndrome child can at least perform certain tasks at a given age. This information should assist the parents, educators, physicians, and others to plan ahead and encourage further development.

FORWARD

This book is desperately needed for both professionals and parents. It is an important addition to the literature because it updates data on Down Syndrome individuals which in the past was largely based upon information gained from institutional settings. From the data in this book, it is obvious that Down Syndrome infants and children raised at home generally are more capable than comparable infants and children raised in an institution. Yet, professionals, by and large, still are often guilty of recommending early institutional care rather than the loving kindness available at home. This book will help professionals understand the wide range of ability of infants with Down Syndrome and make them more cognizant of the advantages of home care.

Further, this book focuses on the parent group movement for Down Syndrome that is developing all over the world. Professionals have been frustrated by the splintering of the field of the handicapped with groups working for the benefit of cerebral palsy, epilepsy, brain injury, mental retardation, neurologically handicapped, etc. But we must face the fact that advocate groups have played a powerful role in the development of services. Look at what the National Association for Retarded Citizens has accomplished over the years. Now comes a new group, the Down Syndrome Congress. Is there room for another advocacy organization? Looking at the problem over a span of 30 years, it is obvious that much more must be accomplished before we can conclude that such an organization is not needed. We need better counseling services for parents who are just learning that they have a Down Syndrome infant. We need better school, recreational, and adult services. What we do not need is more

institutional services for Down Syndrome infants and children! What we need desperately are the life support systems that will help parents care for their child themselves in a healthy fashion for the family as a whole. In my opinion this book will help accomplish this overall goal.

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Finally, to the families of youngsters with Down Syndrome who opened-up both, their homes and their hearts, and allowed us to gather this data so that their burdens might make someone else's burden a little lighter, and especially for having taught us so much about "human development".

CHAPTER ONE

OVERVIEW

Motor development is of major concern to parents and professionals who work with children with Down Syndrome (DS). This is due to the fact that a minimal level of gross and fine motor proficiency is one of the major prerequisites for effective interaction in the school or the community.

First, physical education is one of the first areas of education where mainstreaming occurs. DS children and adolescents must demonstrate a minimal level of motor skills to fit in with the rest of the class. Secondly, recreation has been the forerunner in the application of the Normalization Principle for the last two decades. Down Syndrome children and adults must possess a minimal level of gross motor skills functioning close to normal pattern of the community at large. Recreational skills allow for and encourage independance. Thirdly, most employment opportunities available to DS individuals require a cetain level of proficiency in manual dexterity.

Currently there is little organized literature devoted specifically to answering questions posed by parents and professionals regarding the motor development of DS children. Although some studies have been conducted, there has been no concerted effort to consolidate the findings of these studies. The following is a critical review and summary that brings together highlights of the research on the motor development of DS children.

Historically, it is of interest to note that Langdon Down, in 1866, first termed the condition which we now refer to as "Down's Syndrome", as "Mongolian type of idiocy" (Down, 1866). The term, "Mongolism", unfortunately, has been used until recently. Similar terms, such as "mongol" or "mongoloid" can still be seen in much of the literature. In 1866, Shuttleworth (1909) introduced the

term, "unfinished children". The term "mongoloid deformity" had been suggested (van der Scheer, 1927). The expression "acromicria" was first used by Schuller (1907) in order to emphasize the characteristic retardation in growth of the facial bones and the ends of the extremities as opposed to acromegaly. Penrose (1949) suggested "generalized foetal diplasia" instead of mongolism. The need for a more appropriate expression than the term "mongolian idiocy", "mongolism", "mongoloid", etc., has led to the use of the term Down's Syndrome. Today experts are shortening the term to Down Syndrome. Because of this fact; throughout this work, the term Down Syndrome or an abbreviated form, "DS" will be utilized.

Down Syndrome Early Motor Development*

The rate of motor development of DS infants is slightly below that of normal infants (Carr, 1970, 1975; Coriat, Theslenco, & Waksman, 1967; Dameron, 1963; Dicks-Mireau, 1972; Fishler, Share & Koch, 1964; Hall, 1979; Levinson, Friedman, & Stamps, 1955; Share & French, 1974a). During the first six months of life, motor development of DS infants closely parallels that of normal infants. After the sixth month, differences in development become apparent. By one year of age, the child with Down Syndrome is often four to five months behind a normal one year old. At age five, the child with Down Syndrome is approximately two years behind; performing many activities at 50 to 70 percent below normal (Butterworth & Cicchetti, 1978; Carr, 1970, 1975; Share & French, 1974b). In one investigation (Share, 1971), not one out of the 212 six year old children with Down Syndrome under seven years of age studied could perform such motor tasks as buttoning a shirt or riding a tricycle. Further it has been suggested

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*This information is revised from an article by Share, J. and French, R. entitled, Motor development of Down Syndrome individuals: A Review. Sharing Our Caring, 5, 1975, 8-14 (with permission).

that female performance is superior to that of the male on motor tasks (La Veck & & La Veck, 1977; Melyn & White, 1973).

Not only do infants with Down Syndrome, as a group, acquire motor skills at a slower rate, but there is a difference in the rate of development between infants with Down Syndrome who are institutionalized and those raised at home. Infants with Down Syndrome raised at home perform better than those in institutions (Donoghue, Kirman, Bullmore, Laban, & Abbas, 1970; Kugel & Reque, 1961; Stedman & Eichorn, 1964). For example, in one study most home reared infants with Down Syndrome walked by five years of age; but only 60 percent of an institutionalized population accomplished this task by six years of age (Centerwell & Centerwell, 1960). Reasons for apparent differences seem to be two fold. First, mentally retarded children because of a multiple handicap, severe cardiac and respiratory problems, etc., tend to be more readily placed in an institution, while the healthier children with Down Syndrome with similar IQ's generally remain at home. Secondly, institutionalized personnel tend to group rather than individualize or personalize their programs further limiting potential development.

Differences in development of motor skills between identified chromosomal groups of children with Down Syndrome have also been reported. Infants with translocation karyotype reportedly stood up earlier than those with the standard trisomy karyotype. However, the standard trisomy group walked earlier. Individuals with Down Syndrome who have a mosiac chromosomal arrangement, though, generally tend to do better in their overall development (Gibson & Pozinyi, 1965). This appears to be related to a greater percent of normal cells in the mosiac karyotype group (Clarke, Edwards, & Smallpiece, 1961). While these results are highly speculative, there may be possible identifiable differences among the different karotypes.

Investigators have also described the walking patterns of DS children (Donoghue, Kirman, Laban, & Abbas, 1968, Gustavson, 1964; James, 1974; Kucera, 1967; Oster, 1957; Penrose, 1966). In general, the mean (average) age for walking ranges from two and a half years to five years depending on the study. Further, when developed, the performance of this skill may be slow, clumsy and uncoordinated.

It is interesting to note, that while a delay in motor development has been continually been reported, most training programs can have a positive effect. Connolly, Morgan, Russell, and Richardsor, (1980), Kanter, Clark, Allen and Chase, (1975), and Zansmer, Pueschel, & Shea, (1975) stated that with stimulation and training initiated during infancy, motor skills can be significantly improved. On the contrary, Harris (1981) did not report any significant results in a motor training program. It should be noted though, that there were several limitations reported by the investigator because of the research design.

Down Syndrome Child and Adolescent Motor Development

Disparity in motor development between normal children and those with Down Syndrome continues into late childhood and adolescence. In children with Down Syndrome eye-hand coordination is generally deficient, resulting in difficulty with fine motor tasks and very unsteady hand movements (Thompson, 1963). Fine motor skills of children with Down Syndrome are deficient when compared to non-DS mentally retarded children (Cassel, 1949; Gordon, 1944; Hermelin & O'Conners, 1961; Knights, Hyman, & Wonzy, 1965; O'Connor & Hermelin, 1961).

Gross motor skills of children with Down Syndrome are also deficient when compared to normal and non-DS mentally retarded children (Blessing, 1959; Frith & Frith, 1974; Henderson, Morris, & Ray, 1981; Kralovitch, 1959; Pertego, 1950); paticularly in motor tasks involving laterality, balance, and skills using movement and vision together (Chen & Wolley, 1978; LeBlanc, French, & Schultz, 1977;

Cratty, 1966). Burkett (1973) reported that overarm throwing patterns of children with Down Syndrome follow the same stages as normals, but are delayed.

In addition to difficulty with fine and gross motor tasks, children with Down Syndrome do not physically appear as fit as normals (Hayden, 1964; Hillard & Kirman, 1957; Nordgren, 1970; Bjorke, Hagen, & Kline, 1978; Ness, 1974; Oseland, 1980; and Skroback-Kaczynask & Varek, 1980). While cardiovascular endurance is deficient (Coleman, Azaoub, & Friedrick, 1976; Wang & Eichstaedt, 1980), it can be improved and muscles strengthened to slightly below normal limits, through a structured training program. They also do not have as rapid reaction times as other mentally retarded children (Berkson, 1960a & 1960b, Geiger, 1975, Henderson, Morris, & Frith, 1981; Knights, Atkinson & Hyman, 1967; Kramer, 1969; Sersen, Astrup, Flopsted, & Wortis, 1969).

The deficient motor skills of children with Down Syndrome has been attributed to lowered muscle tension, termed hypotonia (Cowie, 1970; Crome, Crowie & Slater, 1966; Hermelin & O'Connor, 1961; Melyn & White, 1973; Rynders, 1974). Hypotonia is one of the most reliable findings in the newborn period followed by the characteristic findings in the head and face in the early identification of a Down Syndrome infant (Benda, 1956). After an examination of 86 DS infants and children, it was reported that the most common physical finding was generalized hypotonia which was present in 97.7 percent (McIntire & Dutch, 1964). While Hall (1970) suggested that muscle hypotonia disappears by childhood, lack of muscle tone has tentatively been related to a smaller cerebellum or cerebellar impairment in DS children. Kirman (1951) demonstrated that the brain stem and cerebellum of DS children is considerably smaller than that of normals. Thyroid and pituitary deficiencies resulting in body builds which are not amenable to strenuous or accurate movement, may also be a contributor to the poor performance of children with Down Syndrome (Cratty, 1969).

Engler (1949), too, had assigned delay in onset of walking more to muscular hypotonia than to general maturational lag; but deduced that since the hypotonia subsides as the child grows older, continuing delays in a neuromotor development must be increasingly a function of primary mental arrest. It is not clear whether he considered the syndrome unique in this respect.

Linear growth and skeletal age of DS children are retarded when compared to normal individuals (Dutton, 1959; Hefkam, 1940; Oster, 1953; Seefeldt, 1966). The slow growth patterns may play a role in the motor development. Further, thyroid and pituitary deficiencies of many of these children result in a body stature which is not amenable to strenuous or accurate movement (Cratty, 1966).

It is generally agreed that DS children and adolescents perform below average in fine and gross motor skills (Sternlight, 1966). The discrepancy between DS and non-DS mentally retarded children has been disputed. In an exploratory investigation between matched groups of DS and "undifferentiated" mentally retarded children , the DS sample did as well, and were superior on some motor tasks (Nakamura, 1965). Other investigators have not reported any significant differences in motor skills of DS and non-DS children (Knights, Atkinson, & Hyman, 1967; Neeman, 1971). The differences in results may be an artifact of the varied experimental tasks. It has been suggested, where there is little need of conceptual understanding in a motor task, e.g., reaction time test, (Knights, Atkinson, & Hyman, 1967), or intellectual quotients are controlled (Clausen, 1968; Le Blanc, French, & Schultz, 1977), the performance of DS and non-DS mentally retarded children is similar.

Down Syndrome Adult Motor Skills

By adulthood, the disparity in motor skills of DS and normal individuals becomes outstanding. Collins (1974) reported that only 25% of adult DS institutionalized population showed mature movement patterns in running, jumping, and

throwing. DS adults have difficulty in performing simple tasks which involve manual dexterity (Cantor & Stacey, 1951; Gireadeau, 1959, Kramer, 1969), particularly those individuals with Down Syndrome with intellectual quotients below 60. While these findings have been questioned (Knights, Atkinson, & Hyman, 1967; Clausen, 1968), tactile discrimination ability of individuals with Down Syndrome is not only more deficient than normals, but lower than non-DS mentally retarded adults. A continued physical fitness deficiency has been reported (Kramer, 1969). This lack of muscle tone interferes in the ability of many individuals with Down Syndrome to obtain employment (Foreman, 1967).

It has been suggested though that individuals with Down Syndrome can be prepared for employment through systematic training programs (Fredericks, 1969; Sechrest, 1968). In the first recorded publication on Down Syndrome, Langdon Down (1866) stated that the manipulative ability of Mongoloids was deficient but could be strengthened by a training program. More recently, Tizard and Loos (1954) and Clarke and Hermelin (1955) reported that after two years of training, some adults with Down Syndrome were able to solder four different colored wires to an eight pin television plug. The lengthy training period reflects the high level of skill needed to be reached by this group.

Drug Therapies and Development

After initial flurry and enthusiasm by its proponents, drug therapy for persons with Down Syndrome has, for many years, been a fertile area for disappointed hope in the possibility of reversing the effects of DS on development. Specific drug studies in which individual medications are dealt with can be readily separated in terms of reported effect largely on the basis of the degree of experimental control employed. As might be anticipated, researchers reporting controlled studies have generally been far less enthusiastic than have those reporting uncontrolled studies.

In an extensive review of the literature, Share (1976) reviewed initial claims and later follow-up studies of various treatment modalities, including pituitary extracts, 5-hydroxytrytophan, Vitamin E, glutamic acid, siccacell therapy, U-series treatment, thyroid, etc. on various facets of development including motor skill acquisition. It was clearly evident, from the reviews, that there have been many claims of effective drug treatment for children with Down Syndrome, but there also have been more methodological problems in the studies, along with lack of confirmation by independent researchers which have discredited what, at one time, was thought to be a hopeful treatment or cure. So far, there have not been any medications that have demonstrated remarkable improvement in the status of DS individuals that have been widely accepted as effective. Early training and education continue to present the greater "pay-off", at this point.

Summary

It is confirmed in the literature survey that there exists a normal progression of motor development by individuals with Down Syndrome but this development occurs at a slower rate. In infancy, they are near normal, reflecting perhaps the unreliability of very early infant measures. By one year of age, infants with Down Syndrome are late in development in almost all motor landmarks, having difficulties in participating in physical activities during their youth, and having added difficulties in employment and self concept during adulthood which is often related to their poor motor coordination.

Research to date tends to come from institutionalized populations. Fortunately, the trend to institutionalize DS individuals has been reversed in many states, and in others it is gradually changing. Individuals with Down Syndrome are being encouraged to stay in their communities and offered supportive services through such agencies as Regional Center for the Developmentally Disabled, parent groups, etc. In so doing, some will be going into the job

market, others into workshop-type facilities. However, the majority will continue to be dependent or semi-dependent on others. Researchers should now focus on a realistic and practical development of systematic intervention techniques (Talkington, Altman, & Ginnell, 1971), since infants and children with Down Syndrome can benefit from stimulation techniques (Barnard, 1975).

The purpose of this book is to assist parents and professionals to stimulate and develop essential fine and gross motor skills of infants and children with Down Syndrome to enhance the optimal growth and use of their potentials. Specific developmental motor landmarks of children in their first six years of life are presented with accompanying activities designed to assist and encourage the development of each landmark.

REFERENCES

Barnard, K.E. Infant stimulation. In Koch, R., & dila Cruz, F.F. Down's Syndrome (Mongolism): Research, prevention and management, New York: Brunner/Mazel, Publishers, 1975.

Benda, C.E. A comprehensive review of Mongolism. Archives of Pediatrics, 73, 391-407, 1956.

Berkson, G. An analysis of reaction time in normal and mentally deficient young men. I. Duration threshold experiment. Journal of Mental Deficiency Research, 4, 1960a, 59-68.

Berkson, G. An analysis of reaction time in normal and mentally deficient young men. III. Variation of stimulus and response complexity. Journal of Mental Dificiency Research, 4, 1960b, 67-77.

Bjorke, G., Hazen, R., Lie, H., and Lkieve, I. Physical activation of mentally retarded children (in Norwegian). Norwegian Medical Association, 1978, 3, 134-136.

Blessing, K. The Middle range mongoloid in trainable classes. American Journal of Mental Dificiency, 63, 1959, 812-21.

Burkett, L.N. Three Dimensional Film Analysis of Overarm Throwing Patterns of Down's Syndrome Children. Unpublished Thesis: Washington State University, 1973.

Butterworth, G., and Cicchett, D. Visual calibration of posture in normal and motor retarded Down's Syndrome infants. Perception, 7, 1978, 513-525.

Cantor, G.N., and Stacey, C. Manipulative dexterity in mental defectives. American Journal of Mental Deficiency, 56, 1951, 401-410.

Carr, J. Mental and motor development in young Mongoloid children. Journal of Mental Deficiency Research, 14, 1970, 205-220.

Carr, J. Young children with Down's Syndrome. IRNMH Monograph 4, Boston: Butterworth and Company, 1975.

Cassel, R.H. Relation of design reproduction to the etiology of mental deficiency. Journal of Consulting Psychology, 13, 1949, 425-428.

Centerwall, S.A., and Centerwall, W.R. A study of children with Mongolism reared in the home compared to those reared away from home. Pediatrics, 25, 1960, 678-685.

Chen, H., and Woolley, D.V. A developmental assessment chart for non-institutionalized Down's Syndrome Children. Growth, 42, 1978, 157-165.

Clarke, C.M., Edwards, J.H., and Smallpiece, V. 21 trisomy/normal mosaicism in an intelligent child with some Mongoloid characteristics. Lancet, 1, 1961, 1023-1030.

Clarke, A.B.D., and Hermelin, B.C. Adult imbeciles, their abilities and trainability. Lancet, 2, 1955, 337-339.

Clausen, J. Behavioral characteristics of Down's Syndrome subjects. American Journal of Mental Deficiency, 73, 1968, 118-126.

Coleman, A.E., Aroub, M.M., and Friedrich, D.W. Assessments of the physical work capacity of institutionalized mentally retarded males. American Journal of Mental Deficiency, 80, 1976, 629-633.

Collins, T.A. A comparison of recreational participation with running, jumping and throwing patterns of institutionalized Down's Syndrome residents. Unpublished Thesis: Washington State University, 1974.

Connolly, B., Morgan, B., Russell, F.F., and Richardson, B. Early Invention and Down Syndrome children. Follow-up report. Physical Therapy, 60, 1980, 1405-1408.

Coriat, L.F., Theslenco, L., and Waksman, J. The effects of psychomotor stimulation on the IQ of young children with trisomy-21. Proceedings of the 1st Congress of the IASSMD, Montpellier, France, Sept. 12, 1967, 377-385.

Cowie, V.A. A study of the early development of Mongols. New York, NY: Pergamon Press, 1970.

Cratty, B.J. The perceptual-motor attributes of mentally retarded children and youth. Los Angeles Mental Retardation Services Board of Los Angeles County, 1966.

Crome, L., Cowie, V., and Slater, E. A statistical note on cerbellar and brainstem weight in Mongolism. Journal of Mental Deficiency Research, 10,

Dameron, L.E. Developmentof intelligence of infants with Mongolism. Child Development, 34, 733-738, 1963.

Dicks-Mireaux, M.S. Mental development of infants with Down's Syndrome. American Journal of Mental Deficiency, 77, 26-32, 1972.

Donoghue, E.C., Kirman, B.H., Bullmore, G.H.L., Laban, D., and Abbas, K.A. Some factors affecting age of walking in a mentally retarded population. Developmental Medicine and Child Neurology, 12, 1968, 781-792.

Donoghue, E.C., Kirman, B.H., Laban, D., Abbas, K.A. "Age of walking in the mentally retarded." Proceedings of the First Congress of the International Association for Scientific Study of Mental Deficiency. England: Michael Jackson Publishing, 1968, 754-759.

Down, J.H. Observation on an ethnic classification of idiots. London Hospital Clinic Lecture Reports, 3, 1866, 259-260.

Drummer, G.M. Strength and flexibility in Down's Syndrome children. Paper presented at the AAHPER Research Consortium, Washington, D.C., 1978.

Dutton, G. The physical development of Mongols. Archives of Diseases in Children, 34, 1959, 46-50.

Engler, M.A. Mongolism (Peristatic Amentia). Baltimore: Williams & Wilkins, 1949.

Fishler, K., Share, J., and Koch, R. Adaption of Gesell Developmental Scales for evaluation of development in children with Down's Syndrome (Mongolism). American Journal of Mental Deficiency, 68, 1964, 642-646.

Firth, U., and Firth, C.D. Specific motor disabilities in Down's Syndrome. Journal of Child Psychology and Psychiatry. 1974, 15, 293-301.

Forman, T.M. The Mongoloid child behavior description. Special Education in Canada, 41, 1967, 9-11.

Fredericks, B.A. A comparison of the Doman Delacato Method and behavior modification method upon the coordination of Mongoloids. Project supported by research grant RD2753P68. Oregon: Division of Oregon State System of higher education, 1969.

Geiger, W.L. The perceptual and gross motor ability of mentally retarded children. Paper presented at the mid-west AHPER Convention, Grand Rapids, Michigan, 1975.

Gibson, D., and Pozonyi, J. Morphological and behavioral consequences of chromosome subtype in Mongolism. American Journal of Mental Deficiency, 69, 1965, 801-804.

Girardeau, F.L. The formation of discrimination learning set in Mongoloid and normal children. Journal Comparative and Physiological Psychology, 52, 1959, 566-576.

Gordon, A.M. Some aspects of sensory discrimination in Mongolism. American Journal of Mental Deficiency, 49, 1944, 55-63.

Gustavson, K. Down's Syndrome. Sweden: The Institute for Medical Genetics, Alonquist Wilksells, 1964.

Hall, B. Somatic deviations in newborn and older children. Acta Paediatrica, (Scand.), 59, 1970, 199-204.

Harris, S.R. Effects of Neurodevelopmental therapy on motor performance of infants with Down's Syndrome. Developmental Medicine and Child Neurology, 23, 1981, 477-483.

Hayden, F.J. Physical fitness for the mentally retarded. Toronto, Canada: Metropolitan Association for Retarded Children, 1964.

Hefke, H.W. Reengenologic study of anomalies of the hands in one hundred cases of Mongolism. American Journal of Diseases of Children, 60, 1940, 1319-23.

Henderson, S.E., Morris, J., and Frith, U. The motor deficit in Down's Syndrome children: A problem of timing. Journal of Child Psychology and Psychiatry, 22, 1981, 233-244.

Henderson, S.E., Morris, J. and Ray, S. Motor performance in Down's Syndrome children: An analysis of the Cratty six category gross motor test. American Journal of Mental Proficiency, 1981, 85, 416-424.

Hermelin, B., and O'Connor, N. Shape reproduction in normal children and Mongol and non-Mongol imbeciles. Journal of Mental Deficiency Research, 1961, 5, 67-77.

Hillard, L.T., and Kirman, B.H. Mental deficiency. London: J. and A. Churchill Ltd., 1957.

James, R.J. Multivariate analysis of the walking behavior in institutionalized Down's Syndrome males. Unpublished Thesis: University of Wisconsin, Madison, 1974.

Kantner, R.M., Clark, D.L., Allen, L.C., and Chase, M.F. Effects of vestibular stimulation on nystagmus response and motor performance in the developmentally delayed infant. Physical Therapy, 56, 1976, 414-421.

Kirman, B.H. Epilepsy in Mongolism. Archives of Disease in Childhood, 26, 1951, 501-503.

Knights, R.M., Atkinson, B.R., and Hyman J.A. Tactual discrimination and motor skills in Mongoloid and non-Mongoloid retardates and normal children. American Journal of Mental Deficiency, 71, 1967, 894-900.

Knights, R.M., Hyman, J.A., and Wozny, M.A. Psychomotor abilities of familial, brain-injured and Mongoloid retarded children. American Journal of Mental Deficiencies, 70, 1965, 454-57.

Kralovich, A.M. A study of performance differences of the Catell Infant Intelligence Scales between matched groups of organic and Mongoloid groups of organic and Mongoloid subjects. Journal of Clinical Psychology, 15, 1959, 198-199.

Kramer, P.G. Developmental trends of selected performance items in Mongoloid males. Unpublished Thesis: Springfield (Massachusetts) College, 1969.

Kucera, J. Age at walking, at eruption of deciduous teeth and response to ephedrine in children with Down's Syndrome. Journal of Mental Deficiency Research, 1967, 13, 143-48.

Kugel, R.B., and Reque, D. A comparison of Mongoloid children. American Medical Association Journal, 175, 1961, 959-961.

La Veck, B., and La Veck, G.D. Sex differences in development of young children with Down Syndrome. Journal of Pediatrics, 90, 1977, 767-769.

LeBlanc, D., French, R.W., and Shultz, B. Static and dynamic balance skills of trainable children with Down's Syndrome children. Perceptual and motor skills, 45, 1977, 641-642.

Levinson, A. Friedman, A., and Stamps, F. Variability of Mongolism. Pediatrics, 16, 1955, 43-54.

McIntire, M.S., and Dutch, S.J. Mongolism and general hypotonia. American Journal of Mental Deficiency, 68, 1964, 669-70.

Melyn, M.A., and White, D.T. Mental and developmental milestones of non-institutionalized Down's Syndrome children. Pediatrics, 52, 1973, 542-45.

Nakamura, H. An inquiry into systematic differences in the abilities of institutionalized adult Mongoloids. American Journal of Mental Deficiency, 69, 1965, 661-65.

Neeman, R.L. Perceptual-motor attributed of mental retardates: A factor analytic study. Perceptual and Motor Skills, 33, 1971, 927-934.

Ness, T.A. Weight training for severely mentally retarded persons. Journal of Health, Physical Education and Recreation, 1974, 45, 87-88.

Nordgren, B. Physical capabilities in a group of mentally retarded adults. Scandinavian Journal of Rehabilitiation Medicine, 1970, 2, 125-132.

O'Connor, N., and Hermelin, B. Visual and stereognostic shape recognition in normal children and Mongol and non-Mongol imbeciles. Journal of Mental Deficiency Research, 5, 1961, 63-66.

Oseland, D.J. Physical fitness comparisons between Down's Syndorme students and Moderately mentally impaired students. Unpublished thesis: Illinois State University, 1980.

Oster, J. Mongolism. Copenhagen: Danish Science Press, 1957.

Oster, J. Mongolism: A Clinicogeneological Investigation Comprising 526 Mongols Living on Seeland and Neighbouring Islands in Denmark. Copenhagen: Danish Scientific Press, 1953.

Penrose, L. Down's anomaly, London: J. and A. Churchill Ltd., 1966.

Penrose, L.S. The incidence of mongolism in the general population. Journal of Mental Science, 95, 1949, 685-688.

Pertego, S.J. La escalle metrica de Oseretsky para el examen de motorica. Revista Psychological General Applied, 5, 1950, 539-553. In Psychological Abstracts, 26, 6283, 1957.

Rynders, J. Your Down's Syndrome child's muscular development. In Horrobin, M. and Rynders. To Give An Edge. Minneapolis, Minnesota: University of Minnesota, 1974, 58-60.

Sechrest, L. Exercise as an operant response for retarded children. Journal of Special Education, 2, 1968, 311-317.

Seefeldt, V.D. A longitudinal study of physical growth and development in Down's Syndrome. Unpublished dissertation: University of Wisconsin, 1966.

Sersen, E.A., Astrup, C., Flopsted, I., and Wortis, J. Motor conditional reflexes and word associations in retarded children. American Journal of Mental Deficiency, 1969, 74, 495-501.

Share, J. A study of New Zealand Down's Syndrome children under six years of age. Unpublished doctoral dissertation, National University of Mexico, 1971.

Share, J., Review of drug treatment for Down Syndrome persons. American Journal of Mental Deficiency, 80, 1976, 388-393.

Share, J., and French, R. Early motor development in Down's Syndrome children. Mental Retardation, 12, 1974a, 23.

Share, J., and French, R. Guidelines of early motor development in Down's Syndrome children for parents and teachers. Special Children, 1, 1974b, 61-65.

Shuttleworth, G.E. Mongolian imbecility. British Medical Journal, 2, 1909, 661-665.

Skrobak-Kaczyski, J., and Varek, T. Physical fitness and trainability of young male patients with Down's Syndrome. In K. Berg & B.O. Kriksson (Eds.). Children and exercise IX. Baltimore: University Park Press, 1980.

Stedman, D.J., and Eichorn, D.H. A comparison of the growth and development of institutionalized and home-reared Mongoloids during infancy and early childhood. American Journal of Mental Deficiency, 69, 1964, 391-401.

Sternlicht, M. A talk to parents of the Mongoloid child. New York: Staten Island Aid for Retarded Children, 1966.

Schuller, A. Infantilsmus. Wien med Wochnschr. 57, 1907, 629. Cited in Benda, C.E. The child with mongolism (congenital acromicria). New York: Grune and Stratton, 1960.

Talkington, L.W., Altman, R., and Grinnel, T.K. Effects of positive and negative feedback on the motor performance of Mongoloids. Perceptual and Motor Skills, 33, 1971, 1075-1078.

Tizard, J., and Loos, F.M. The learning of a spatial relations test by adult imbecils. American Journal of Mental Deficiency, 59, 1954, 85-90.

Thompson, N. M. Psychological characteristics relevant to the pre-school Mongoloid children. Mental Retardation, 1, 1963, 148-151, 185-186.

Van der Scheer, W.M. Beitrage zur Kenntnis der mongoloiden missbildung. Abhandl. Neurol and Psych. 42, 1927, cited in Benda, C.E. The child with Mongolism (congenital acromicria). New York: Grune and Stratton, 1960.

Wang, P., and Eichstaedt, C.B. A study of physical fitness levels of mentally handicapped children and adolescents in Illinois. Illinois: Governor's Planning Council on Developmental Disabilities, Illinois Special Olympics, and Illinois State University Department of Health, Physical Education, Recreation, and Dance, 1980.

Zansmer, E., Pueschel, S., and Shea. A. A sensory-motor stimulation program for the young child with Down's Syndrome. Preliminary Report 2 (4); Washington, D.C.: MCH Exchange, Department of Health Care Administration, The George Washington University, 1972.

CHAPTER TWO

HOW TO USE THE BOOK

Introduction

This book is designed to assist parents and professionals working with DS individuals to identify the median age of onset* for specific fine and gross motor skills by DS and normal infants and children. Differences and delays between normal and DS children are given for each landmark for comparative purposes. Appropriate activities leading to the attainment of each motor landmark are described and illustrated. The equipment and toys used are illustrated at the end of this chapter.

Recording and evaluating a child's development is important. In Appendix A, fine and gross motor landmarks** are categorized developmentally. For example, all landmarks leading to the skill of walking are sequenced under the heading "walking". Data comparing DS and normal infants and children is given for each landmark, including a column to enter the date the child first attained the landmark.

In Appendix B, all fine and gross motor activities are sequenced under the appropriate landmark in order of difficulty. For example, activities leading to the ability to ride a tricycle are listed under "Tricycle Riding" in order of difficulty in performance. The column on the right side of each page of this Appendix is for recording activities completed by the infant or child.

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* Median age refers to that age which at least half the infants or children are capable of performing these motor skills.

** Fine motor activities involve the use of small muscle groups, such as picking up raisins with fingers or coloring. Gross motor activities involve large muscle groups, such as walking, throwing, and skipping.

It must be remembered that median scores reflect the age of onset of a landmark for DS children as a group. A wide variation exists. Such variables as home vs. institutional rearing, socio-economic background, physical stature, and heredity should be considered.

Landmarks should be considered as guidelines which do not place limitations on a given child. It is the hope of the authors that information presented will enable parents and those others working with Down Syndrome children to plan ahead systematically and encourage optimal development of potential.

Information regarding pertinent texts, books, periodicals, pamphlets and other resources appear in Appendices C, D, E, F, and G.

For the purpose of simplification, we will consider three stages of the child's motor development as Infancy, Toddlerhood, and Childhood.

Infancy - Birth to 14 months.

During this time children are dependent on others for basic care. The normal infant learns to sit steadily for an indefinite period of time, creep, stand alone momentarily, and pick up small objects with a pincer grasp.

Toddlerhood - 15 months to 30 months.

The normal child is able to walk, carry, haul, shove, walk up and down stairs, seat self in a chair, jump with both feet, turn pages in a book one at a time, and hold a crayon with fingers while drawing.

Childhood - 30 months to six years.

The normal child learns to paint, work with and carry building materials such as boxes, and has developed basic skills needed to participate in playground activities.

Guidelines for Teaching

The three criteria for learning motor skills are (1) correct task choice, (2) appropriate methods of motivation, and (3) conditions for learning. These three criteria are interdependent. Instructional guidelines are presented for each of the criteria.

1. Correct task choice

   Each landmark and accompanying activities selected must be based on the child's developmental level. Try not to underestimate or overestimate the child's ability. Continuously re-evaluate the landmark and activities selected.

2. Methods of Motivation

   Basic to learning the motor skill selected is motivation to perform the activities. Some methods of motivation or reinforcement are: verbal praise, physical affection, consumable and non-consumable rewards, social reinforcement, and special privileges. The child should have an incentive; a pay-off for trying or performing the task.

   If the child is not intrinsically motivated to perform, try considering:

   A. Is the incentive appropriate to influence the child to perform or is the chosen task or environmental conditions for learning incorrect?

   B. Are a variety of appropriate incentives being offered?

   C. Reward immediately after each task performance while the task is initially being learned. As the skill is mastered, rewards should be reduced in quantity and given less frequently.

3. Conditions for Learning

   A. Efficient learning of a motor skill is facilitated by building on skills already acquired; then gradually and systematically progressing to more complex but related skills.

B. Depending upon the motor skill and the child's level of functioning related to the skill, provide a variety of sensory cues to assist the child in understanding the task. Examples of cues are: guide the child's body through a movement pattern, demonstrate the task, and present visual or auditory stimulation.

C. Repeat skills or activities being learned as well as those already partially or fully learned to assist the child's retention and reinforce confidence and self-esteem.

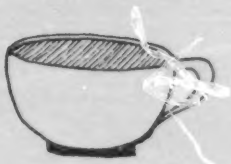
D. Provide a wide variety of experiences which include already acquired skills and those in the process of being learned.

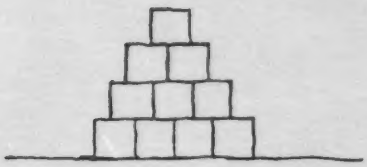
E. Daily practice of skills is essential. Fifteen to 30 minutes of structured physical activity and play is a reasonable minimum.

As mentioned, these three criteria are dependent on each other. There should be a balance between the three criteria determined by the parent or educator before efficient motor skill learning will take place. If the child presents discipline problems, incentives may not sufficiently control maladaptive behavior. The difficulty may stem from the activity being too complicated for the child to understand and respond (correct task choice). If the child refuses to attend to the learning experience, the choice of reward or reinforcement may be inappropriate (methods of motivation). If the task has too many or two few verbal cues the child may become frustrated (conditions of learning).

In the following text, landmarks and accompanying activities are presented. It should be noted that professional consultation is often beneficial. Down Syndrome children present special problems for their families and themselves; but then "normal" children do too.

TOYS AND EQUIPMENT





CHAPTER III

FINE AND GROSS MOTOR LANDMARKS WITH ACCOMPANYING EXERCISES AND ACTIVITIES BIRTH TO SIX YEARS

FINE AND GROSS MOTOR LANDMARKS AND ACCOMPANYING

ACTIVITIES: IN INFANCY

I. Infants can Sit with Head Erect, but Thrust Forward and Unsteady.*

Landmark acquired: normal infants by 3 months

DS infants by 3 months

Sits with Head Erect

Suggested activities and exercises to enhance development:

1. Place infant on stomach and speak to him to get his attention.

---

*This is the first in a series of landmarks leading to sitting. For information related to other sitting landmarks refer to pages, 25, 35, and 53.

2. Passively elevate infant's head and rotate slightly.

3. Place infant on stomach and raise shoulders gently.

4. Move playpen frequently to give infant opportunity to observe people and other activities.

5. Tap infant on the opposite side from which he is looking.

6. Place infant on your lap in a sitting position in front of a mirror. Encourage him to lean forward and pat the mirror.

7. Place favorite toy in infant's view, then slowly raise the toy as he raises his head.

8. Use bell, rattle, etc., to encourage infant to turn head and locate the sound. Place infant in different positions when performing this activity, i.e., seated in infant seat, lying on back, lying on stomach.

9. Place infant in back or front carrier when shopping or on family outings.

10. Wiggle your fingers and encourage infant to grasp them, then raise him up. Be careful the infant does not fall backwards onto a hard surface. It is recommended that this activity be performed on a large pillow.

11. Have infant grasp a colorful scarf and pull him up to a sitting position.

12. Place infant on his back and move a noisy, colorful object from side to side over his head to get him to follow the object.

13. Place a moving mobile in crib or playpen.

14. Place infant in sitting position. Hold the infant's shoulders and move him forward, diagonally and sideward until he begins to lose balance. Assist the infant to regain balance. Gradually withdraw assistance as infant demonstrates competence.

II. While Supported, Infant can Bear Small Fraction of His Weight Momentarily. *

Landmark acquired: normal infants by 3 months

DS infants by 3 months

Bears Small Fraction of Weight

Suggested activities and exercises to enhance development:

1. Allow infant, while sitting on your lap facing you, to push up with his knees as you support him up under his arms.
2. Place hands around infant's waist and bounce him so his legs support him momentarily.
3. While holding infant, place him in front of a mirror so he can observe himself. This will attract his attention and motivate him to continue activity.

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*This is the first in a series of landmarks leading to standing. For information related to other standing landmarks refer to pages 37 and 42.

III. Infant can Sit with Head Set Forward.

Landmark acquired: normal infants by 4 months

DS infants by 5 months

Sits with Head Forward

Suggested activities and exercises to enhance development:

1. While supporting infant's neck and shoulders with one arm and holding infant's body with the other, balance infant on your knees. Gradually release support of neck and shoulders, then decrease support of infant's body so he is sitting on your knees without support. Be ready to resume support if infant loses balance.

2. Place infant in a corner using the walls as support. At first place pillows on both sides of infant for additional support. Begin practice sitting session for short periods of time (1 minute), then increase time gradually.

3. Place infant in a nearly upright position on your lap when feeding him a bottle.

4. Sit infant on a rug and place high pillow around him on all sides.

5. Place infant on the floor on his back. Hold his upper arms and slowly raise him up and down. As the infant's strength increases, move arm support toward his hands and increase the number of sit-ups.

6. Place infant in sitting position on your lap, then carefully bounce him up and down. Sing a rhythm to him while performing the activity.

7. Place infant in a sitting position, then sit behind him to one side and talk to him.

8. Lay infant sideways then on stomach across your lap so he must rotate his head to look at you.

9. Place infant on a pillow with head and chest on the floor. While supporting infant at his waist, encourage him to raise his head and chest off the floor. Gradually add another pillow to increase the distance between the top of the pillow and the floor.

10. Place an inflatable ring around infant's waist for support. Gradually reduce the amount of air in the ring.

11. When you are sitting in a chair reading or watching television, sit infant against chair and between your legs and provide the infant with favorite toys. Your legs should provide the necessary support for the maintenance of the sitting position.

12. Place infant on back. Put a favorite toy or small ball inside the front of diaper and encourage him to raise up and to remove it.

13. While infant is sitting, place a toy just outside one leg so the infant must turn and lean to reach it.

14. Place infant in a sitting position and give him toys to play with such as a ball or balloon that requires two hands to hold.

15. Play games such as patty-cake or peek-a-boo while sitting.

16. Sit infant inside toys that rock, but do not tip over.

IV. Infant Is on the Verge of Rolling, While Lying on Stomach: One Arm Tends to be Semi-Extended, the Other Flexed; the Infant Shows a Tendency to Roll Over His Extended Arm.*

Landmark acquired: normal infants by 4 months

DS infants by 5 months

On Verge of Rolling

Suggested activities and exercises to enhance development:

1. Place infant on stomach. Put toys with music or sound to infant's side and call him to motivate to rolling over.

2. Roll infant to his side from stomach, leading with top arm and leg. Complete turn until he is on his back. Gradually reduce amount of help. These activities can be enhanced by utilizing a variety of surfaces for activities, such as, the carpet, blankets, sheets, mattress, grass, etc.

---

* This is the first in a series of landmarks leading to rolling over. For information related to another rolling landmark refer to pages 28 and 30.

3. Place infant on your stomach and help him roll off you.

4. Place infant on blanket and gently raise one end of the blanket, rolling him around the blanket.

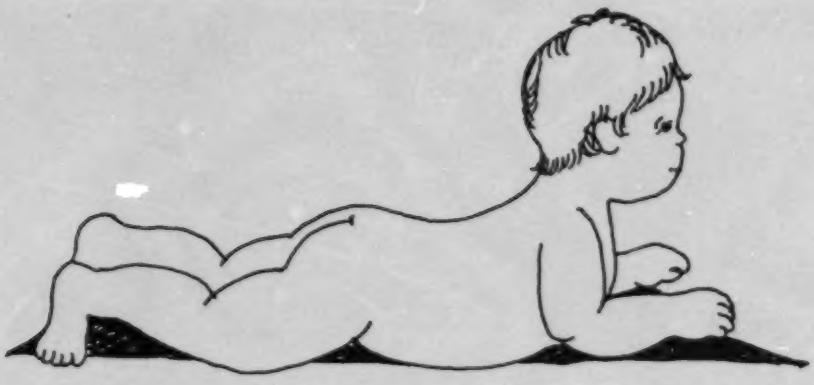
5. Place infant on back. Let infant observe a mobile. Then place him on his stomach and encourage him to roll over to see mobile or musical toy.

6. Place infant partially on side with pillow supporting elevating one side of his body.

V. <u>While Lying Face Downward, Infant can Rest Weight on Hands with Chest Off Crib or Surface</u>.

Landmark acquired: normal infants by 5 months

DS infants by 7 months



Rests Body Weight on Hands

Suggested activities and exercises to enhance development:

1. Place infant on a pillow face down where his arms and feet are not fully supported and gradually reduce size of pillow, thus increasing his weight on elbows and forearms.

2. Hold bottle or toy with sound in front of infant, gradually raising object, thus encouraging him to follow it with his head so he begins to push up with arms and hands.

3. Place towel around infant's chest and gently lift him up so his weight is partially supported on arms and legs. Gradually decrease the amount of support.

4. Place infant in crawl position and gently rock back and forth to stimulate postural response.

5. Play in water.

VI. Infant Has an Insecure Cube Grasp.*

Landmark acquired: normal infants by 5 months

DS infants by 6 months

Has Insecure Cube Grasp

Suggested activities and exercises to enhance development:

1. Provide grasping activities such as rattle, bell, spoon, rings, etc. Place your hand over his and grasp. Gradually let go of his hand to see if he will retain object.

---

*This is the first in a series of landmarks to cube grasping. For information related to other landmarks refer to pages 32 and 39.

2. While bathing infant or during water play, pull washcloth through hands or squeeze sponge into hand, etc.

3. When infant begins to reach with a crude grasp, give infant objects which are small enough to fit in his palm.

4. Encourage infant to reach and grasp his toes, feet, fingers, and clothing.

5. Place balloons or colorful handkerchiefs and ribbons around infant's wrists and encourage him to shake his arms.

6. Provide some type of finger food at meals.

7. Have infant grasp four fingers and shake them in all directions. Eventually have infant grasp a towel and do the same activity.

8. Rub infant's palms.

9. Place both hands together and pat them.

10. Pull clothes with different textures across infant's palm and through index finger and thumb.

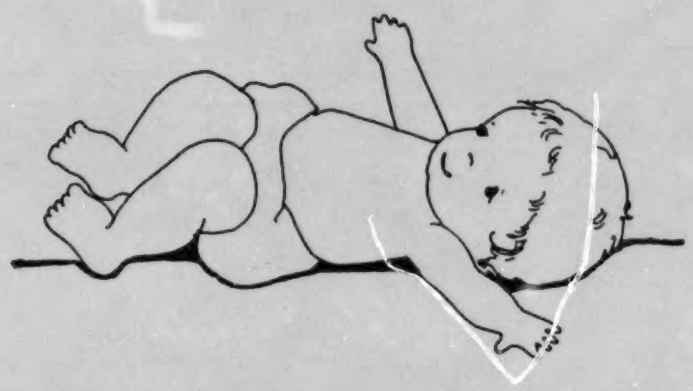
11. Grasp the infant's hands and place his hands around objects with different colors, shapes, and textures. Then rub his hands on the object. Begin with fairly large objects and then decrease the size.

12. Encourage infant to grasp your fingers, pat your face, hands, etc.

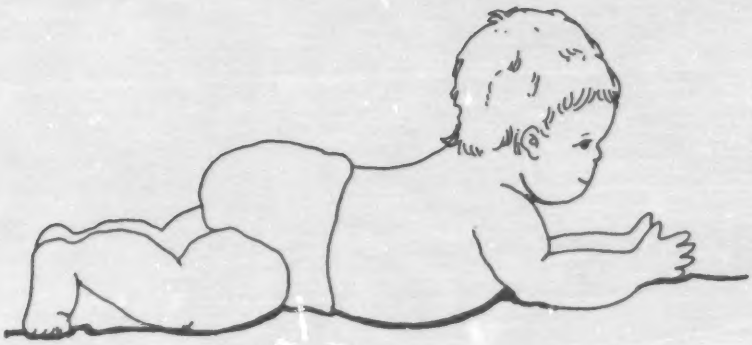
VII. Infant Can Roll From Back to Stomach.

Landmark acquired: normal infants by 6 months

DS infants by 7 months



Step 1



Step 2

Rolls from Back to Stomach

Suggested activities and exercises to enhance development:

1. Position infant on his back and change his center of gravity for rolling, guide his top arm and leg and rotate head; complete roll until on stomach. Tuck his lower arm into his side to keep the arm from being caught underneath him as he rolls. Gradually reduce the amount of help. Repeat going the opposite direction.

2. While lying on your back, place infant on your stomach and help him roll off you, from his back to stomach.

3. Place infant on blanket and gently raise one end of the blanket, thus rolling the infant over from back to stomach.

4. Place infant on back. Use favorite toy near face and hands, encouraging him to reach. Then gradually move toy to one side encouraging infant to follow with eyes and head. Next help infant turn over to get the toy.

VIII. Infant can Grasp Objects

Landmark acquired: normal infants by 6 months

DS infants by 7 months

Grasps Cube with Palm

Suggested activities and exercises to enhance development:

1. Place varied size, shape, and textured toys in bathtub for water and sponge play for infant to play with.
   Empty and fill objects in low containers (cake pan, plastic bowls).

2. Place a suction toy on the infant's high chair.

3. Tie colorful objects with different textures on a rope across the infant's crib and play-pen.

4. When infant is sitting or lying on his stomach with a pillow or bolster under his chest, put a weighted toy, block tower, or suction rattle within his reach and demonstrate how to play with it.

5. Give the infant objects which are small enough to fit in the palm of his hand and hence are easier to grasp. These might include small plastic blocks, rattle with small handle, or small squeeze toys.

6. Encourage infant to reach and grasp toes, feet, fingers, and his clothing as well as your fingers, hands, and clothing.

7. Use baby bottle to get infant interested in touching objects. Place infant's hands around it and place your hands over it.

8. Use stuffed animals and dolls which are fun to touch, and have some exciting characteristics such as fur, hair, long ears, or tails. Place them near infant so that by moving around he will come in contact with it, and will feel stimulated to touch it again and again.

9. Place small piece of fur on infant's stomach or in his lap to stimulate his interest to touch and play with it.

10. Dangle colorful, noisy toys in front of infant. Have him touch or hit at them.

11. Place small bells on infant's clothing such as sleeves, on the front of sweaters, on booties or shoes, or on wrists and ankles. When infant is active, bells will ring and attract his attention to grasp and reach for them.

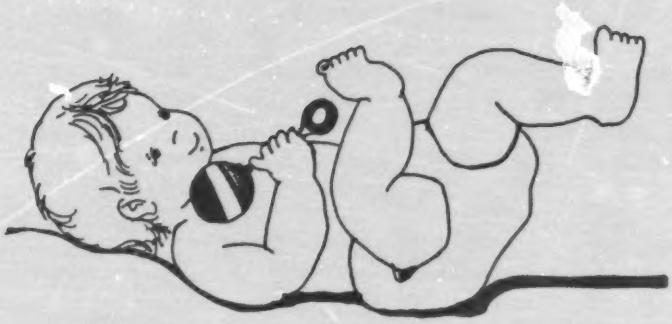
12. Tickle or scrape the sole of his foot while helping him to bring his foot up toward his head. Place his hand around it and help him to hang on to it. Withdraw your hand and observe if infant grasp on his own.

13. Stimulate various body parts by tickling with a feather or string which will cause the infant to bring his hands to the place where the sensation occurs.

IX. Infant Retains Rattle; Can Hold onto Rattle Without Immediate Release.

Landmark acquired: normal infants by 6 months

DS infants by 10 months



Retains Rattle

Suggested activities and exercises to enhance development:

1. Have infant grasp your fingers as you pull him up.

2. While bathing infant or during water play activities, pull washcloth through his hands and fingers or place sponge in hand and squeeze. Encourage him to do it on his own.

3. Place varied size, shape, and textured toys in bathtub for water and sponge play. Empty and fill objects in low containers (cake pan, plastic bowl). Provide numerous push-pull toys.

4. Set up an "infant proof" environment where infant may explore freely and where "no-no's and don't touch" are only occasionally necessary.

X. Infant Can Maintain an Erect Sitting Position (for approximately one minute or momentarily). Months Later Both Normal and DS Infants Should be Able to Maintain This Position for 10 Minutes.

Landmark acquired: normal infants by 7 months

DS infants by 11 months

Sits in an Erect Position

Suggested activities and exercises to enhance development:

1. Place infant 1-2 inches from a wall or a corner of a couch, giving the infant no support. Use objects that attract infant's attention. He may reach for object and attempt to maintain balance.

2. While infant is sitting between your legs, lean infant in many directions.

3. Get infant to reach and retrieve favorite toys by leaning and righting himself or dangle toys to get infant to lean over and pull on them without falling over.

4. Seat infant in high chair for meals.

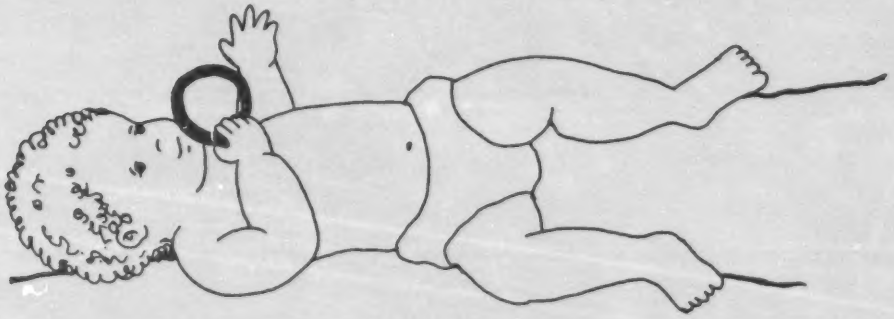
5. Seat infant in front of a small toybox. Have him lean forward to pick up toys.

6. Have infant grasp a colorful handkerchief while in a sitting position and pull him sideward and forward encouraging him to re-erect himself.

XI. Infant Can Transfer Dangling Ring or Cube from One Hand to the Other.

Landmark acquired: normal infants by 7 months

DS infants by 11 months



Transfer Object from One Hand to the Other

Suggested activities and exercises to enhance development:

1. Refer to activities on page 34.

2. Hand small objects to the infant on his less favored side to stimulate him to transfer it to the hand with which he is more comfortable.

3. Put small objects on a flat surface (e.g. a rug remnant on a table) and have infant pick them up. Gradually reduce the size of the objects.

XII. Infant Can Stand and Maintain Balance Briefly While Holding His Hands.

Landmark acquired: normal infants by 8 months

DS infants by 13 months

Stands Briefly with Assistance

Suggested activities and exercises to enhance development:

1. Hold infant at his waist and bounce him so that his legs support him for a few seconds.

2. Hold infant in front of a mirror or window to distract the infant's attention from standing.

3. Place a dish towel under infant's arms. Support him by holding ends of the towel. Gradually reduce support.

4. Encourage infant to let go of your thumb and stand alone for a few seconds. Gradually increase the length of time.

5. Encourage standing and holding onto furniture.

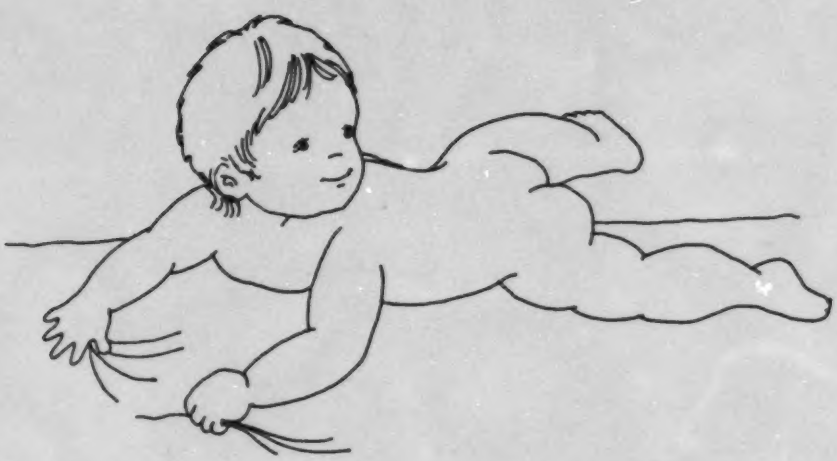
6. Attempt to get infant to let go of furniture and stand without support by placing a favorite toy just beyond his reach.

7. Place infant's bottle, some food, or a favorite toy on the edge of a table so the infant must stand to reach it.

XIII. <u>While on Stomach Infant Can Partially Turn About (Pivot)</u>

Landmark acquired: normal infants by 8 months

DS infants by 12 months



While on Stomach, Partially Turns About

Suggested activities and exercises to enhance development:

1. Change infant's position frequently.

2. Make sure clothes are loose and do not bind infant for freedom of movement.

3. Give bicycle-type exercise of legs.

4. Exercise arms and legs while bathing or changing diaper.

5. Encourage seeking behavior of familiar voices, objects, etc.

6. Place infant's favorite toys to the side of his body, just out of reach.

XIV. Infant Can Grasp Cube by Placing Thumb and Fingers Around It.

Landmark acquired: normal infants by 9 months

DS infants by 13 months

Grasps Cube with Thumb and Fingers

Suggested activities and exercises to enhance development:

1. Refer to activities on page 32.

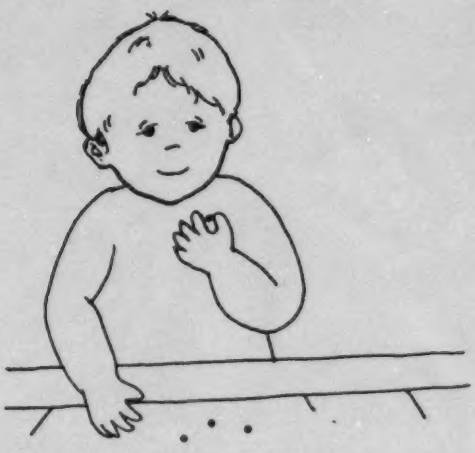
2. Allow infant in the kitchen to play with pots and pans. Add numerous other household objects.

3. Sit infant on the floor or on a low table. Use rolling toys such as an empty paper towel roll or plastic rolling pin close within his reach. Show him how he can reach out and get the roll. Gradually move the roll away so he must reach for it.

XV. Infant Can Grasp Pellet or Raisin by Using Thumb and Finger in a Scissors-Type Movement.*

Landmark acquired: normal infants in 9 months

DS infants in 14 months



Grasps Small Objects Using Scissors-Type Movement

Suggested activities and exercises to enhance development:

1. Refer to activities on pages 39.

2. Show infant how to grasp and open snap-type clothespins. Begin with loose springs that are easy to open. Have infant pick them up by using his thumb and fingers. Place pins on stuffed toys and encourage infant to play by removing them from the toys.

3. Give infant small round objects to roll in his fingers, (i.e., ball of playdough or plastic beads). Let infant squeeze the playdough balls with his fingers.

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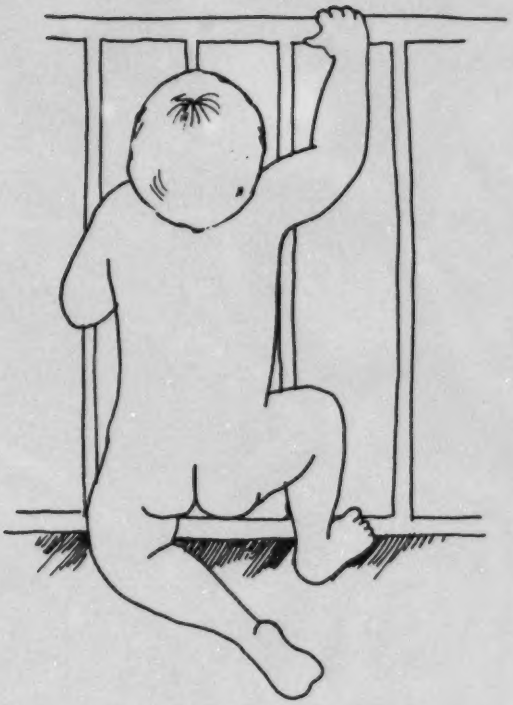
*This is the first in a series of landmarks leading to grasping pellets. For information on another pellet grasping landmark refer to page 46.

XVI. Infant Can Use Rail of Crib to Pull Self to a Standing Position.

Landmark acquired: normal infants by 10 months

DS infants by 18 months



Pulls Self Up to Standing Position

Suggested activities and exercises to enhance development:

1. When sitting, playing, or reading to the infant, have him stand between your legs which will provide support for the standing position.

2. Place the infant's favorite toy on a low table so he can reach it from a kneeling position.

3. When infant is in his crib or playpen, show him how to reach up to grasp the top of the sides of the crib or play pen. Also hand a favorite toy at the level of the top of the crib.

4. Place dish towel around infant's chest and under arm pits. While standing behind him grasp towel close to infant's body and support his body weight. Gradually reduce the amount of support and move grip on the dowel farther away from body.

5. While you are in a standing position, stand infant on your thighs, support him at his thighs. Let go momentarily. Gradually increase the time without support. Also move infant backward and forward and from side to side.

6. Hold infant in a standing position on a bed and assist him in bouncing.

7. Have infant grasp onto a small hoola hoop, then move the hoop around and back and forth.

8. Have infant grasp colorful wands (a dowel 1' x 1") in each hand. While kneeling behind him and at the opposite ends of the doweling, tilt the dowels in the same direction and at the same time. Then move them independently. Gradually begin to move the doweling in different directions.

9. Place toys on a low table and have infant stand and play with them.

10. Stand infant in a corner and play games, such as, patty-cake, so-big, and peek-a-boo. Gradually increase distance from the corner.

XVII. Infant Can Creep on Hands and Knees. *

Landmark acquired: Normal infants by 10 months

DS infants by 15 months

Creeps on Hands and Knees

Suggested activities and exercises to enhance development:

1. Have infant do bicycle-type exercises with legs.
2. Exercise arms and legs while bathing or changing diaper.
3. Place infant in creeping position and gently rock back and forth.
4. Place infant in a face down position on a pillow so that his arms and feet are not fully supported and let him play.
5. Dangle favorite toy in front of infant. Encourage him to raise his head higher and higher so he begins to push with arms and hands.
6. Place infant into a "puppy dog" position (legs tucked underneath him, with some weight supported by extended arms). Rock the infant back and forth.

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*This is the first in a series of landmarks leading to creeping. For information related to another landmark refer to page 49.

7. Place infant in creeping position. Then move right arm forward, then push left leg forward, left arm forward, then right leg forward. Repeat this sequence.

8. Place a desired object out of reach of infant so he must crawl or creep to reach it. Hold infant at the hips to aid him in assuming a crawling position.

9. Put infant in scooter which supports his body weight and have him propel himself.

10. Place infant on a blanket or mat for at least one hour a day, allowing him to explore rolling and crawling.

11. Attempt to have infant retrieve objects, first at a very close range then increase the distance.

12. Once the infant can crawl on a level surface, provide obstacles to climb around and over. Gradually increase heights until equivalent to a step.

13. Dress infant in clothes that allow freedom of movement.

XVIII. While Holding onto a Rail or With Both Hands Held, the Infant Can Move Around Freely.*

Landmark acquired: normal infants by 12 months

DS infants by 21 months

Moves Around Freely while Holding Rail

Suggested activities and exercises to enhance development:

1. Place mirror on couch so the infant can look into mirror when standing.

2. Place infant in front of low window so he may look out when standing.

3. Place infant's chest of drawers next to crib so the infant must stand to take his favorite toys off the chest.

4. While infant is standing with support, move his legs at the knees, in a side-step, or place a toy out of reach to encourage side-stepping to reach toy.

5. Have infant push a baby buggy.

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* This is the first in a series of activities leading to walking, for information related to other walking landmarks refer to pages 47, 48, 51, 57, 63, and 75.

XIX. Infant is Easily Able to Pick Up a Pellet or Raisin Using the Thumb and Finger.

Landmark acquired: normal infants by 12 months

DS infants by 21 months

Can Pick up Small Object with Thumb and Finger

Suggested activities and exercises to enhance development:

1. Refer to activities on page 40.
2. Place a large colorful sock over a hand and have the infant remove it.
3. Give infant opportunities to place toys in containers. Gradually decrease the size of the toys and the containers.
4. Place large buttons or poker chips on shag rug. Have infant pick them up. Next try this activity on a table top.
5. Have infant take raisins out of small raisin box.

XX. Infant Can Walk With Only One Hand Held.
Landmark acquired: normal infants by 13 months

DS infants by 27 months

Can Walk with One Hand Held

Suggested activities to enhance development:

1. Place favorite toys or food on tables where the infant cruises. Help infant up using your fingers and try to get him to take a step or two to each table. Give verbal praise. Let infant stand against table and eat or play with a toy.

2. Use a mirror so infant can see his movements.

3. Use Jolly Jumper or mini-trampoline to build leg muscles.

4. Stand behind infant holding his hands and walk infants.

5. Place brightly colored booties with bells on his feet so they will ring when he steps.

6. Place infant on back and help him move legs like he was riding a tricycle.

FINE AND GROSS MOTOR LANDMARKS AND ACCOMPANYING EXERCISES
AND ACTIVITIES: IN TODDLERHOOD

XXI. Toddler Can Walk a Few Steps Without Assistance, Starting, and Stopping.

Landmark acquired: normal toddlers by 15 months

DS toddlers by 30 months

Walks a Few Steps without Assistance

Suggested activities and exercises to enhance development:

1. Place toddler between two chairs and gradually separate so that he must take a step(s) to go from one chair to the other. If toddler moves too fast and is unable to maintain balance of is unable to control stopping and starting, give verbal praise or other reward when he walks at the correct pace or stops at the appropriate times.

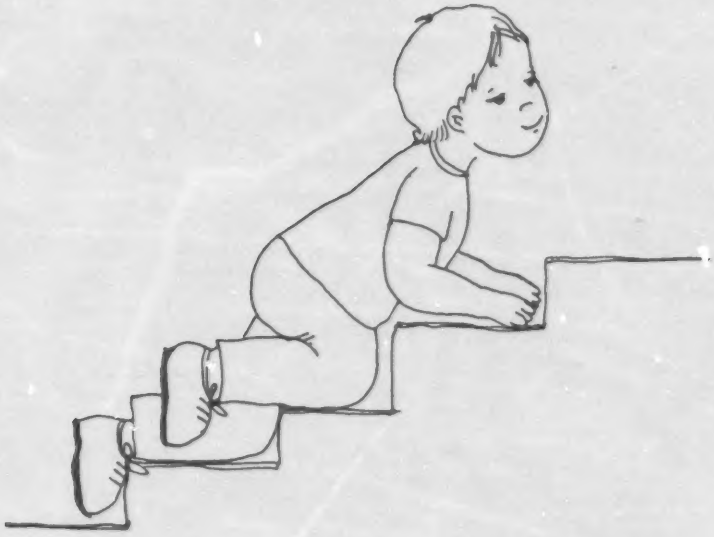
2. Allow the toddler the opportunity to push a chair across a smooth surfaced floor.

3. Hold on to toddlers shirt for support and gently slide one leg at a time forward. Gradually decrease the support. The activity can also be done by using a dish towel placed under toddler's arms pits instead of holding his shirt.

XXII. Toddler Can Creep Up at Least One or Two Steps.

Landmark acquired: normal toddlers by 15 months

DS toddlers by 24 months



Creeps up Steps

Suggested activities and exercises to enhance development:

1. Refer to activities on page 43.

2. When toddler can creep well on a flat surface place an obstacle for him to crawl on and over. Gradually increase height of obstacle.

3. Place toddler on hands and knees on the stairs. Get down with the toddler and attempt to help him up the stairs, using alternate extension of opposite arm and leg pattern.

4. Place toddler at the bottom of the stairs. You sit about four steps up. Dangle the toddler's favorite toy or food. Gradually increase the number of steps the toddler must travel to reach the toy or food.

XXIII. Toddler Can Stack Two Cubes, One on Top of the Other.

Landmark acquired: normal toddlers by 15 months

DS toddlers by 24 months

Stacks Two Cubes

Suggested activities and exercises to enhance development:

1. Provide tin cans of various sizes to make a pyramid or put them inside each other. Paint cans different colors.

2. Begin with rings from stacking post or beads with large holes and a firm thick rope or stacking post.

3. Put one block in front of the toddler and one block in front of yourself. Sit in front of the toddler. Take a second block and with great emphasis, place the second block on top of the first. Immediately give the toddler a second block and tell him to put it on top (again demonstrate with your block). If toddler puts block on top, then you take a third block and place it on top of your tower. Immediately give the toddler a third block. Constantly reinforce him by praising his accomplishments.

XXIV. Toddler Seldom Falls When Walking.

Landmark acquired: normal toddlers by 18 months

DS toddlers by 30 months

Seldom Falls When Walking

Suggested activities and exercises to enhance development:

1. Walk over, in, around, through, up and down objects. Walk on rough, smooth, wet, dry, hard, soft, even and uneven surfaces.

2. Place footmarks on floor with the distance between them at normal stride for toddler. Gradually decrease the length and width of stride. Also, place feet so they go to the left or right.

3. Repeat activity number two with hands on hips.

4. Repeat activity number two but walk to the end of the footmarks, and bending down, pick up an object.

5. Provide pull toys that make sound.

XXV. Toddler Can Walk Upstairs With One Hand Held.

Landmark acquired: normal toddlers by 18 months

DS toddlers by 55 months

Walks Upstairs with Hand Held

Suggested activities and exercises to enhance development:

1. Stand behind toddler holding his hands and walk upstairs, the last few steps from top. Gradually increase the number of steps. Help toddler hold railing with one hand and hold your hand with his other hand. Then eliminate your support but stand behind him.

2. Provide opportunity to practice walking, up stairs with help as well as incentives.

3. Practice walking up curbs holding onto toddler's hand.

4. Move toddler's legs up and down in a marching fashion. Try this activity to music.

5. Place colored items on stairs that match color of toddler's sock. Ask toddler to match the color of a sock to a matching color piece of cloth on the next step. Increase the number of stairs the toddler must match and gradually remove the visual cues.

XXVI. Toddler Can Seat Self in Small Chair.

Landmark acquired: normal toddler by 18 months

DS toddlers by 30 months

Can Seat Self in Small Chair

Suggested activities and exercises to enhance development

1. Purchase or obtain a chair for the toddler that is easy for him to slide on and off. Place chair in area where toddler plays so he identifies it as his chair. Ask the toddler to sit in his chair or put him in it.

2. Give toddler an opportunity to practice a variety of ways of getting on and off his chair as well as attempting other types of chairs (i.e., adult chairs).

3. Place a large chair next to a toddler's chair. Sit in the large chair then point to the small chair and ask toddler to sit like you.

XXVII. Toddler Can Throw a Ball.*

Landmark acquired: normal toddlers by 18 months

DS toddlers by 30 months

Throws Ball

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*This is the first in a series of activities leading to ball throwing. For information related to another throwing landmark refer to page 80.

Suggested activities and exercises to enhance development:

1. Provide a variety of balls of different sizes and textures for toddler to explore.

2. Place your hand over toddler's, squeeze ball and then release it. (A ball not much larger than the toddler's hand is best).

3. Stand behind toddler and guide his hand through the throwing motion, throwing the ball to another person or into a container.

4. Wad up paper and throw them at a wall target or have a paper fight.

5. Cut out pictures of zoo animals and glue them on a piece of strong cardboard. Pretend that the toddler is feeding the animals by throwing waded up paper balls, fluff balls and nerf balls at the pictures. Make the noise of the animal he fed. Gradually increase the distance the toddler must throw food as his skill improves.

XXVIII. Developmental Landmark: Toddler Can Turn Pages in a Book; Usually Two or Three at a Time.*

Landmark acquired: normal toddlers by 18 months

DS toddlers by 24 months

Turns Pages in a Book

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*This is the first in a series of activities leading to page turning. For information related to another page turning landmark refer to page 60.

Suggested activities and exercises to enhance development

1. Put small flat objects partially buried in the sand, e.g., large buttons or cardboard disks, and have toddler pick them out of the sand using his thumb and index finger.

2. Have toddler turn pages of storybooks with plastic coated or cardboard pages. When toddler can turn thick cardboard pages, give him a book with paper pages.

3. Read story to the toddler and show him how to turn the pages as you read the story.

4. Give toddler old catalogues and magazines to play with.

XXIX. Toddler Can Squat While Playing.

Landmark acquired: normal toddlers by 21 months

DS toddlers by 36 months

Squats while Playing

Suggested activities and exercises to enhance development:

1. Encourage stooping and recovering to standing position by:

   a. Placing the toddler next to a table lower than his arm's length.
   b. Placing his favorite toy on the floor next to him.
   c. Gradually increase distance between toddler's reach until he must squat and then rise to a standing position.
   d. Holding both of the toddler's hands while he is standing, then gradually put him into a squatting position.

XXX. Toddler Can Walk Downstairs With One Hand Held.

Landmark acquired: normal toddlers by 21 months

DS toddlers by 36 months

Walks Downstairs with Assistance

Suggested activities and exercises to enhance development:

1. Provide opportunity to practice walking down stairs with help, as well as incentive.

2. Stand behind toddler holding his hands and walk downstairs the last few steps from bottom. Lift his arm higher on the side he is stepping down on. Gradually increase the distance and decrease assistance. Use some type of incentive at the bottom of stairs. Then help the toddler to hold railing with one hand.

3. Place colored items on stairs that match the color of the toddler's socks. Ask toddler to match the color of a sock to a matching color piece of cloth on the next step. Increase the number of stairs the toddler must match and gradually remove the visual clues.

XXXI. Toddler Can Kick a Large Ball After Demonstration.

Landmark acquired: normal toddlers by 21 months

DS toddlers by 36 months

Kicks Ball after Demonstration

Suggested activities and exercises to enhance development:

1. Allow toddler to kick the ball by himself. Vary the size of the ball.

2. Have the toddler walk up and kick a stationary ball. Gradually increase the speed at which the toddler approaches the ball.

XXXII. Toddler Able to Run Well Without Falling, But Still Not Fast.

Landmark acquired: normal toddlers by 24 months

DS toddlers by 42 months

Runs Well, but Not Fast

Suggested activities and exercises to enhance development:

1. Play games such as chase, tag, hide and seek. For the rules of specific activities refer to French, R. and Jansma, P. Special Education Columbus, OH: Charles C. Merrill Company, 1982.

2. Use music, clapping and verbalization to speed up the toddler's pace.

3. Use dramatization - running like a horse, dog, a mouse.

4. Provide open space for running.

5. Develop obstacle courses for the toddler to run through, walking through it first. If toddler can master an obstacle course of two or three obstacles add more, make them more difficult, and vary direction. Practice running fast, slow, then fast.

6. Practice running backwards and sideways.

7. Run forward, turn and continue running in same direction.

8. Explore different ways of running.
   a. Can you run taking long (short) steps?
   b. Put your arms in as many different positions while running.
   c. How many directions can you run?
   d. Can you run as fast as you can, then stop as quickly as you can?
   e. How many high (low) steps can you take while running?
   f. Run with heavy (light) steps.
   g. Run with your body in different positions (bent forward, sideward, backwards).
   h. Can you run on your toes?

XXXIII. Toddler Can Turn Pages of a Book One at a Time in Either Direction.

Landmark acquired: normal toddlers by 24 months

DS toddlers by 24 months

Turns Pages in Book One at a Time

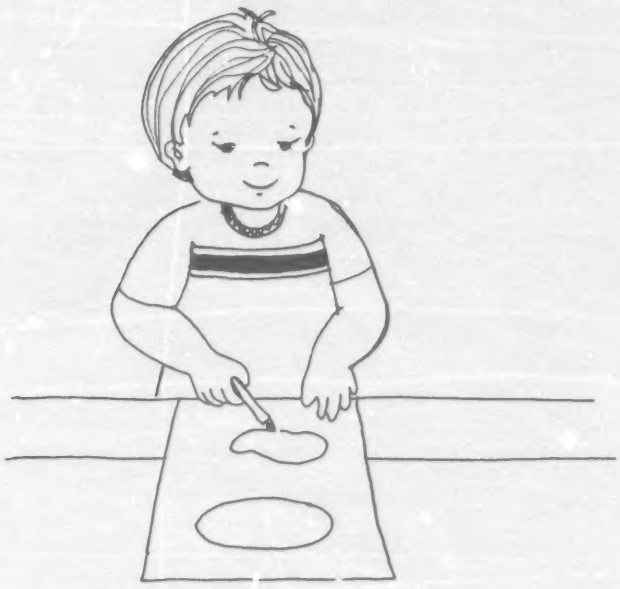
Suggested activities and exercise for development:

1. Refer to activities on page 55.
2. Moisten finger tips, if needed, for better grip.
3. Have toddler begin to anticipate story book sequence.

XXXIV. Toddler Can Imitate Circular Stroke After Demonstration; May Approximate a Circular Scribble.*

Landmark acquired: normal toddlers by 24 months

DS toddlers by 47 months



Imitates Circular Stroke

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*This is the first in a series of landmarks leading to drawing and writing. For information related to other drawing and writing landmarks refer to pages 66, 67, 74, and 82.

Suggested activities and exercises to enhance development:

1. Tell toddler to look as you scribble on the paper. Make sounds to go along with your strokes to attract toddler's attention. Now ask toddler to draw.

2. Help toddler to hold crayon but do not insist he hold it in his fingers. If toddler does not make any marks, hold crayon with him and help him to make marks.

3. Give toddler frequent opportunities to scribble on large pieces of paper.

4. Do not force toddler to use one hand or the other.

5. Draw a circle and ask child to imitate.

6. Hold toddler's hand and assist him through movement.

7. Make a template of a circle to assist the toddler. Gradually decrease the width of template as toddler's skill improves.

8. Allow toddler to finger paint and do chalkboard activities.

9. Cover table with oil cloth. Place large pieces of crayon on table and let child scribble with varying colors.

XXXV. Child Can Walk on Tiptoes After Demonstration.

Landmark acquired: normal child by 30 months

DS child by 48 months

Walks on Tiptoes

Suggested activities and exercises to enhance development:

1. Encourage child to reach objects that are out of his reach unless he is on his tiptoes.

2. Have child stand on toes while holding on to both his hands, then try holding only one of his hands.

3. Stand in front of a mirror so child can see himself.

4. Have child stand on tiptoes and push a small chair or stool.

5. Have child walk on toes while holding onto your hand. Gradually decrease the amount of assistance.

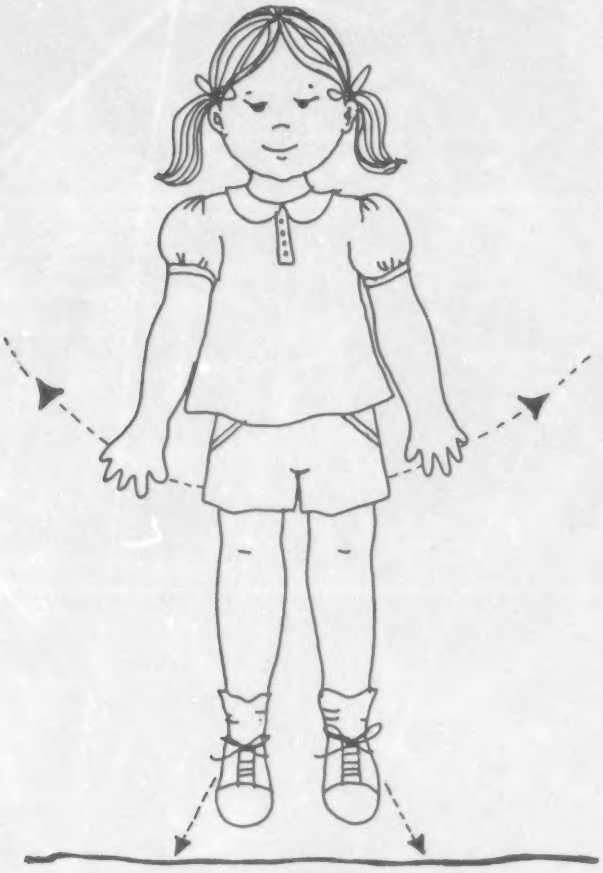
6. Walk on tiptoes in rhythm to a drum.

7. Try the activities above on a variety of textures.

XXXVI. Child Can Jump Up With Both Feet Off the Floor After Demonstration.*

Landmark acquired: normal child by 30 months

DS child by 48 months



Jumps up with Both Feet

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* This is the first in a series of landmarks leading to the developing of jumping skills. For information related to another jumping landmark refer to pages 70 and 78.

Suggested activities and exercises to enhance development:

1. Stand next to child and demonstrate a jump. Then hold child's hand and jump with him. Continue until child is confident and let him jump alone.

2. Ask child to imitate you while you jump over a chalk line or a rope.

3. Jump from one color shape to another.

4. Encourage child, with your assistance, to jump off curbs or stairs. Gradually increase height, make sure child puts his arms out to sides for support, and bends knees on landing.

5. Once child can jump in place, have him stand on bottom step, put your arms out, tell him to jump and move up and down.

6. Jump to rhythm of "jump-jump".

7. Jump in place without rope.

8. When child is able to jump over a low obstacle, provide him with higher obstacles such as hula hoops, tires, or a jump rope gently swinging.

9. Jump over a rope. If possible, use a trampoline to aid the child to raise both feet at the same time. Also, let child observe the act and demonstrate. "Simon Says" also is good to get them to follow a movement.

10. Jump over two ropes next to each other, then gradually increase the distance between the ropes.

11. Have child jump from heights of six inches and then twelve inches.

12. Have child swing arms in direction of jump and lean forward to cover a greater distance. Make sure he pushes off against floor, and bends his knees slightly when landing.

13. Jump and land with knees bent.

14. Run, jump, and land.

15. Jump, land, and jump again.

16. Jump, turn, and land.

17. Suspend ball on string and have child attempt to jump and touch it with his hand. Gradually increase height.

18. Suspend ball on string and have child attempt to kick it with preferred foot, then non-preferred foot. Gradually increase height of the ball.

XXXVII. Child Can Hold a Crayon by Fingers in an Adult Fashion Rather than by Fist When Drawing.

Landmark acquired: normal child by 30 months

DS child by 42 months

Holds Crayon in Adult Fashion

Suggested activities and exercises to enhance development:

1. Have a large crayon and a large piece of paper ready. Get child interested in the objects by drawing lines on the paper. Ask him "Can you do it?". Hand him the crayon and let him experiment.

2. Tell child to look as you scribble on the paper. Make sounds to go along with your strokes to attract child's attention.

3. Help child to hold crayon but do not insist he hold it in his fingers.

4. If child does not make any marks, hold crayon with him and help him to make marks.

5. Give child frequent opportunities to scribble on large pieces of paper.

6. Continue procedure of demonstrating how to make a circle while child watches and have him imitate until most of his circles are accurate. Occasionally put stars or draw faces in his circles.

7. Show child a drawn circle which he has not watched being produced. Tell him it is a circle and to draw one like it. If he has difficulty doing this, let him trace over the model.

8. Do not force child to use one hand or the other.

9. Praise child for holding crayon in adult fashion regardless of whether he holds it too high.

10. Once child grasps crayon in adult fashion, give him short pieces of crayons so he must hold them near the tip.

11. Gradually increase length of crayon, encouraging child to grasp it near the tip.

XXXVIII. Child can Imitate Vertical and Horizontal Strokes.

Landmark acquired: normal child by 30 months

DS child by 60 months

Imitates Vertical and Horizontal Strokes

Suggested activities and exercises to enhance development:

1. Demonstrate a horizontal and vertical stroke. The strokes should be large. Praise child for his attempt to imitate.

2. Guide child's hand through movement.

3. Make a template out of cardboard that provides drawing boundaries to assist child. Gradually decrease width of template as child's skill improves.

4. Give child a piece of paper with incomplete horizonal lines (- - -), and vertical line. Demonstrate to child how to connect dots to make a line. Praise child for his attempts. Gradually reduce the number of dots and increase the distance between them.

5. Activities such as finger painting or drawing lines in the sand are great motivators. Also the use of crayons and colored markers will help.

6. Start with large pieces of paper and then gradually decrease size.

XXXIX. Child Can to Alternate Feet When Going Upstairs in Adult Fashion.

Landmark acquired: normal child by 36 months

DS child by 54 months

Alternates Feet when Walking Upstairs

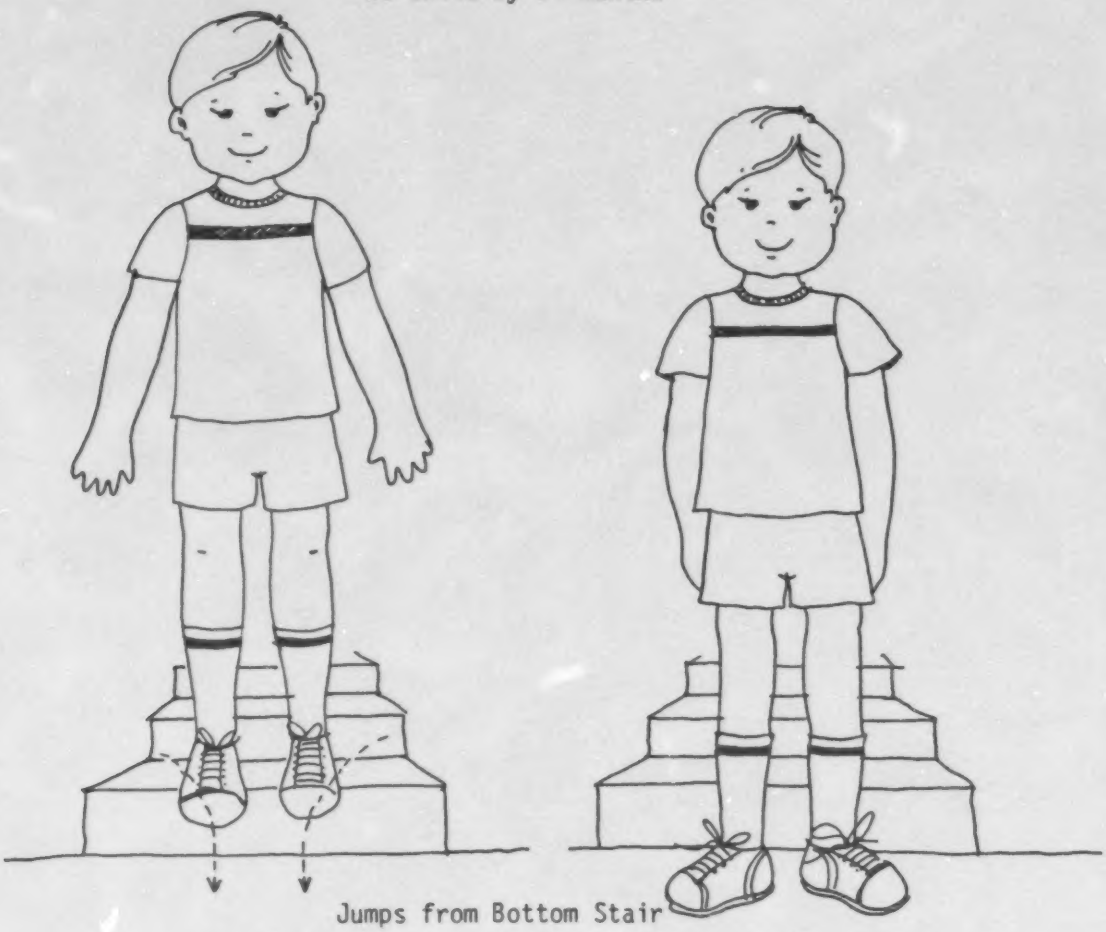
Suggested activities and exercises to enhance development:

1. Refer to activities on page 57.
2. Demonstrate the alternating walking pattern.
3. While child holds onto the rail, move the child's feet in the correct movement pattern.
4. Place footprints made out of colored cloth (i.e. green cloth for right footprints and red for left footprints). You could also match the colored cloth with socks the child is wearing by putting a green and red sock on tne child. Gradually remove clues.

XL. Child can Jump From Bottom Stair With Feet Together, Landing Erect.

Landmark acquired: normal child by 36 months

DS child by 54 months



Jumps from Bottom Stair

Suggested activities and exercises to enhance development:

1. Ask child to imitate you while you jump over a chalk line or a rope.

2. Jump from one color shape to another.

3. Encourage child with your assistance to jump off curbs or stairs.

4. Gradually increase height, make sure child puts his arms out to sides for support, and bends knees on landing.

5. Once child can jump in place, have him stand on bottom step, put your arms out, tell him to jump and move his body up and down.

6. Stand next to child and demonstrate.

7. Hold child's hand and jump with him.

8. Continue until child is confident and let child jump alone.

9. Have child jump off of low structures, (i.e., cardboard blocks).

XLI. Child Can Ride a Tricycle Using Pedals.

Landmark acquired: normal child by 36 months

DS child by 60 months

Rides a Tricycle

Suggested activities and exercises to enhance development:

1. Place child on his back and slowly move him in a scissor-like motion. Have child apply pressure against your hands with his feet, then bend his knees and rotate his feet.

2. Place child on tricycle, hold his feet or secure them on the pedals.

3. Apply pressure to child's knees to help him turn pedals, then get behind child and push and pull him.

4. Practice pedaling for distance.

5. Practice turning by following lines made by tape, chalk, or string.

6. Develop traffic route.

XLII. Child can Unbutton Coat or Shirt, Not Merely Pulling Apart.

Landmark acquired: normal child in 36 months

DS child in 72 months

Unbuttons Coat or Shirt

Suggested activities and exercises to enhance development:

1. Demonstrate to child how to unbutton clothes.

2. Purchase toys that have clothes with large buttons. Reward child for any attempt to unbutton the clothes.

3. Provide child with many opportunities to manipulate objects in order to gain control over finger action and to increase accuracy of movement. Small beads, pennies, pegs, marbles, and buttons are well chosen objects.

4. To begin with have child handle large buttons, then as his manipulative skills increase, diminish the size to smaller and smaller ones. Also, at first have the child put objects through large openings, then gradually decrease their size.

5. Have child place small objects in specific places, i.e., beads on a string or in a small opening of a bottle neck, pennies through the slots of a piggy bank, pegs into the holes of a pegboard, and buttons through the slots of a plastic can lid.

6. Put one piece puzzles together.

7. Place button partially through a button hole and have child pull it out with his fingers. Gradually decrease size of button hole or increase size of button. Also decrease the amount of button showing for him to pull through.

8. Using a piece of cloth with a button, and another piece with a button hole, demonstrate to the child how to push button in and pull out.

9. Try activities 7 and 9 with child's own clothing.

10. Try activities 7 and 9 with child's clothes on him.

11. The backward method to teach unbuttoning is:

    Step A. Present buttoned piece of clothing to the child. Push button halfway through the slot or button hole. Direct child's hand to push the button all the way through. Thus the button becomes undone. Reinforce and praise the child.

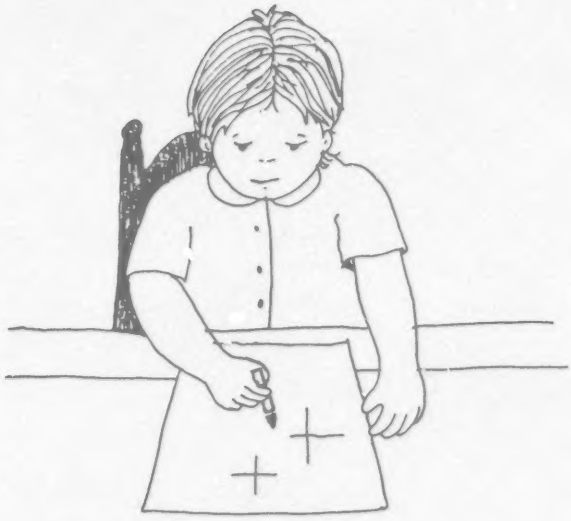
    Step B. Push the button just barely into the button hole. Direct child to complete the task.

    Step C. Present to the child a buttoned piece of easy to manage clothing or a button frame. Ask him to unbutton. Demonstrate how to grasp button with one hand and to hold with the other hand the material on the side with the button hole. Have him complete unbuttoning task.

XLII. Child can Imitate Drawing of a Cross.

Landmark acquired: normal child in 36 months

DS child in 60 months



Imitates Drawing of a Cross

Suggested activities and exercises to enhance development:

1. Refer to activities on page 67.

2. Develop numerous vertical and horizontal patterns on a piece of paper. Guide the child's hands through the movement. Gradually decrease assistance.

3. Develop a template of a cross and have the child trace it.

4. Demonstrate how to make a cross to the child. Afterwards have him try to copy yours with different colored crayons. Then let him try to draw a cross just by looking at a cross already made.

XLIV. Child Can Walk on a Walking Board (2" x 8').

Landmark acquired: normal child in 24 months.
DS child in 72 months.

Walks on Walking Board

Suggested activities and exercises to enhance development:

1. Provide a narrow boundary with lines, a thin rope, or a 4" wide piece of heavy carpeting. Have the child attempt to walk within the boundaries.

2. Provide balance beams of different widths (2", 4", 6") for frontward heel-to-toe. Start with the widest and gradually decrease the width. Gradually increase the height of the beam.

3. Other balance activities include:
   a. walking while balancing objects on hands and/or head,
   b. walking over obstacles on the balance beam, and
   c. trying activities with eyes closed.

4. Try activities one and two without shoes, first holding a hand, then just a finger, then just standing next to him.

5. Walk with two cups of water in hand or bean bags on head. Walk carrying a spoon with a ping pong ball in it.

6. Place a mirror facing one end on the balance beam which allows child to view his own movement.

7. Provide child opportunity to walk on tin can stilts beginning with cans that are wide-based and low to ground and gradually decrease base and increase height. At times, stand behind the child to help him if needed. Many times you may have to mechanically take the child through the basic movement.
   a. Walk with stilt on preferred foot.
   b. Walk with stilt on non-preferred foot.
   c. Using both cans attempt to maintain balance.
   d. Walk forward, sideways, and backward.
   e. Set up an obstacle course.
   f. Replace cans with wooden stilts and try activities of "e".

XLV. Child can Gallop on One Foot.*

Landmark acquired: normal child in 48 months

DS child in 72 months

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*This is the first in a series of landmarks leading to skipping. For information related to another skipping landmark refer to page 83.

Gallops on One Foot

Suggested activites and exercises to enhance development:

1. Demonstrate skill to the child.

2. Hold child's hand and perform together.

3. Practice galloping to a musical instrument or music.

4. Explore the skill of galloping.
   a. Gallop with one foot leading, then the other.
   b. How many directions can you gallop?
   c. What can you do with your arms when you gallop?
   d. How heavily (lightly) can you gallop?
   e. How does a horse gallop?
   f. Can you make yourself very small (tall) when you gallop?
   g. Can you gallop in a square pattern? Try a small square.

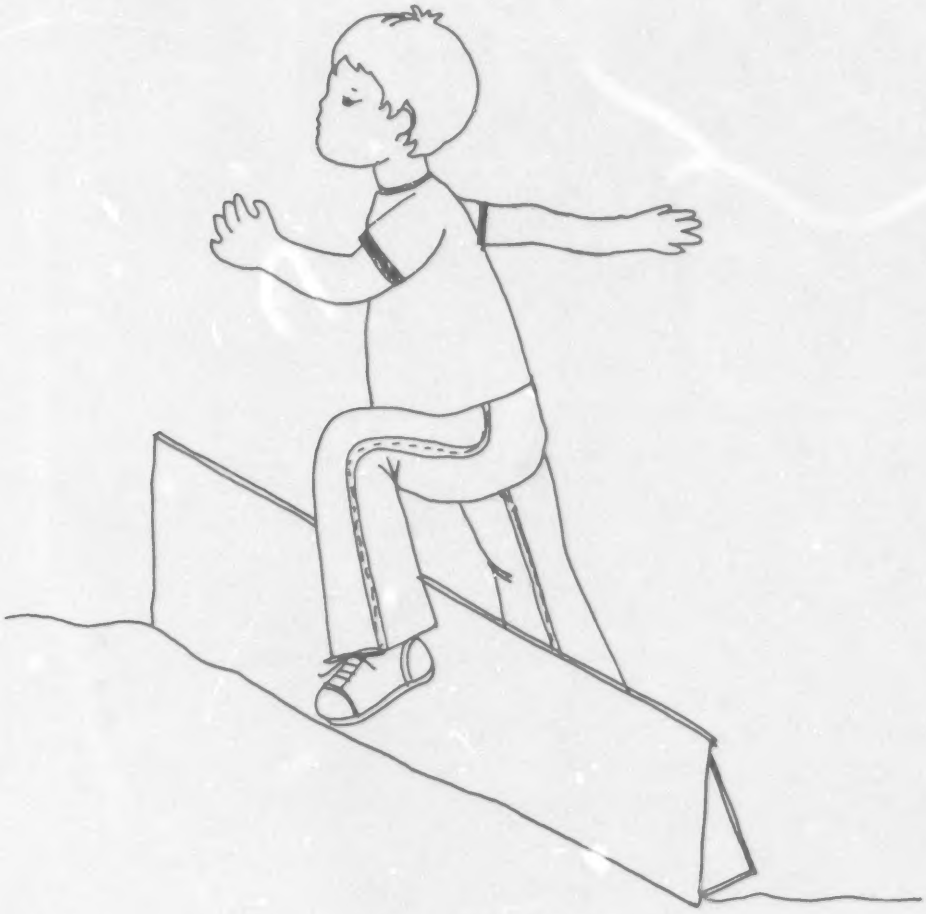
5. Gallop around obstacles made of furniture.

6. Gallop backwards.

XLVI. Child Can Jump While Running.

Landmark acquired: normal child in 48 months

DS child in 72 months



Jumps while Running

Suggested activities and exercises to enhance development:

1. Jump up and down, landing in same spot.
2. Jump over a stationary rope.
3. Jump on two feet in place.
4. Tie a thin string between two chairs. The child attempts to jump it from a standing position, then run and jump over it it. Gradually increase height.

5. Explore the skill of jumping.
   a. How can you get both feet off the ground?
   b. How far (soft, hard, high, etc.) can you jump?
   c. Can you change the shape of your body while in the air (tall, short, round)?
   d. How many ways can you jump and clap your hands?
   e. How would you jump if you were a frog (kangaroo, squirrel, cat)?

6. Jump over a stationary rope. Face a rope turner and attempt to jump up and down while the rope is turning. Start rope turning slowly. Make sure the child follows the rope and jumps on the balls of his feet with knees slightly bent.

7. Swing rope completely over child's head while he attempts to jump it.

XLVII. Child can Throw a Ball Overhand (refer to Appendix B for catching skill progression).*

Landmark acquired: normal child in 48 months

DS child in 72 months

Throws Ball Overhand

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*In the complex act of throwing, there should be body shift, one-handed throw and a step with the foot opposite the throwing arm.

Suggested activities and exercises to enhance development:

1. Refer to activities on page 54.

2. Roll old socks into a ball by starting at the toe. Then throw sock balls into a box, pan, or wastepaper basket.

3. Throw ball up into the air and catch it or, let it bounce then catch it.

4. Practice throwing against a wall, with a target, pitch-back, or a child's basketball net. As skill improves gradually increase distance ball is thrown. Throw ball into waste paper basket or small box.

5. Attempt to knock over empty milk cartons or bleach bottles.

6. Throw ball over objects of varying heights and distances from child.

7. Throw bean bags through small target.

8. Increase the quality of form, force, and accuracy of all throwing activities.

9. Explore the skill of throwing.

   a. How high can you throw a ball and still catch it?
   b. Can you roll a ball to a partner?
   c. How many body positions can you be in and still throw the ball?
   d. How many ways can you throw a ball? (1 hand, 2 hands, chest pass?)
   e. How slowly (fast) can you roll a ball?
   f. Can you throw a ball and make it go between your partner's legs?
   g. Show me the best way to throw a ball fast and straight.

10. Have the child roll a ball down an incline and follow with his eyes.

11. While child is sitting, have him drop bean bags into a large dish or pan. As the child's skill increases, decrease the size of dish or pan and increase the distance he must throw.

XLVIII. Child can Hop on One Foot.

Landmark acquired by normal child in 54 months

DS child in 72 months

Hops on One Foot

Suggested activities and exercises to enhance development:

1. Hop on one foot in place with support of furniture or a person.

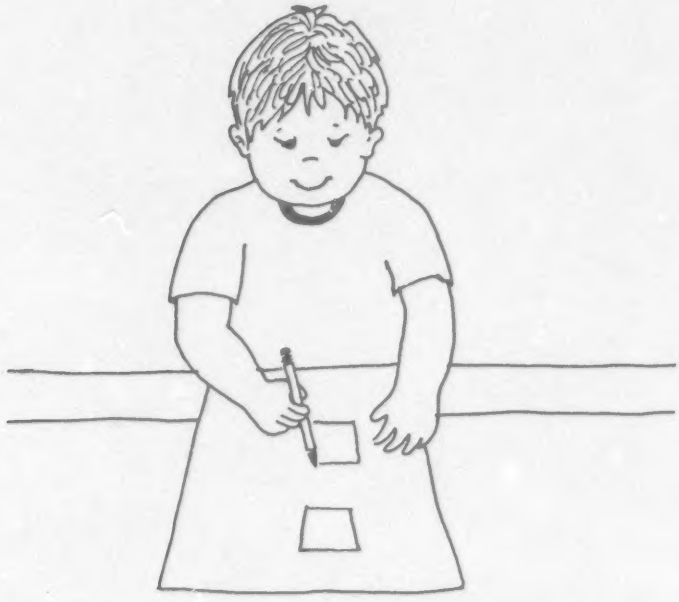
2. Use a broom handle and hold it in front of child at chest high level. The child holds on to it and hops.

3. Refer to activities on page 65, but perform on one foot.

XLIX. Child Can to Copy a Drawing of a Square.

Landmark acquired by normal child in 54 months

DS child in 72 months



Copies a Square

Suggested activities to enhance development:

1. Refer to activities on page 74.

2. Draw a square for child to imitate. Label your drawing a square. Praise child for attempts.

3. Hold child's hand and assist him through movement.

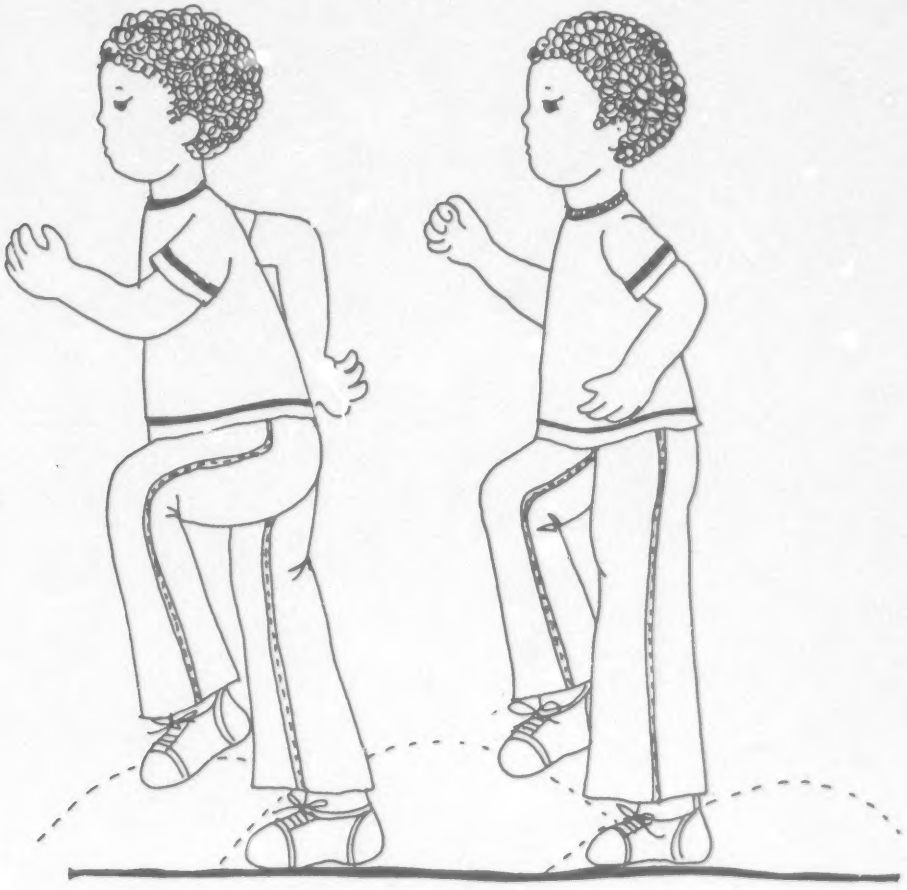
4. Make a template of a square to assist the child. Gradually decrease the width of template as child's skill improves.

5. Give child a piece of paper with an incomplete square. . . . . Demonstrate to child how to connect dots to make a . . square. Praise child for his attempts. Gradually . . reduce the number of dots and increase the distance . . . . between them.

XLX. Child Can Skip, Alternates Lead Foot.

Landmark acquired by normal child in 60 months

DS child in 72 months



Skips Alternating Lead Foot

Suggested activities and exercises to enhance development:

1. Start by galloping. Refer to activities on page 76.
2. Demonstrate skill at different speeds. Show the child that you step forward with one foot and hop at the same time, swing the opposite foot forward and hop on this foot.
3. Practice skipping with the child holding his hand so he feels the rhythm.

4. Practice skipping with music.

5. Explore the skill of skipping.
   a. Can you skip slowly (fast, heavily, lightly?)
   b. What can you do with your arms when you skip?
   c. How high (low) can you skip?
   d. Skip in different directions and avoid collisions.
   e. Can you skip in a square pattern?
   f. Can you skip backwards?

6. Skip forward for 15 to 20 feet.

7. Skip around obstacles made of furniture.

APPENDICES

APPENDIX A

The Developmental Progression of Specific Motor Skills

1. Gross Motor

2. Fine Motor

A-1. The Developmental Progression of Specific Gross Motor Skills

Motor Skill	Age of Onset (in months) Normal	Down Syndrome	Difference In Months	% of Norm Rate
1. Sitting				
sits with head erect, but thrust forward and unsteady	3	3	0	100
sits with head set forward	4	5	1	80
maintains an erect sitting position	7	11	4	64
2. Standing				
while supported, bears small fraction of his weight momentarily	3	3	0	100
stands and maintains balance briefly, with hands held	8	13	5	61
uses rail of crib to pull self to a standing position	10	18	8	56
3. Rolling				
on the verge of rolling over	4	5	2	80
rolls from back to stomach	6	7	1	86
4. Rests weight on hands with chest off crib or surface	5	7	2	71
5. Partially turns on stomach	8	12	4	67
6. Creeps				
creeps on hands and knees	10	15	5	67
creeps up at least one or two steps	15	24	9	63

A-1. The Developmental Progression of Specific Gross Motor Skills (continued)

Motor Skill	Age of Onset (in months) Normal	Down Syndrome	Difference In Months	% of Norm Rate
7. Walks				
moves around freely while holding onto a rail or with both hands held	12	21	9	57
walks with only one hand held	13	27	14	48
walks a few steps without assistance, starting and stopping	15	30	15	50
walks and seldom falls	18	30	12	60
walks upstairs with one hand held	18	55	37	33
walks downstairs with one hand held	21	35	15	58
walks on tiptoes after demonstration	30	48	18	63
alternates feet when going upstairs in adult fashion	36	54	18	67
walks on a walking board	42	72 +	30	58 +
8. Seats self in small chair	18	30	12	60
9. Throwing				
throws a ball	18	30	12	60
throws overhand	48	72	24	67
10. Squats while playing	21	36	15	58
11. Kicks a large ball after demonstration	21	36	15	58
12. Runs well without falling (still not fast)	24	36	15	58

A-1. The Developmental Progression of Specific Gross Motor Skills (continued)

Motor Skill	Age of Onset (in months) Normal	Down Syndrome	Difference in Months	% of Norm Rate
13. Jumping and hopping				
jumps up with both feet off the floor after demonstration	30	48	18	63
jumps from bottom stair, landing erect	36	54	18	67
jumps while running	48	72 +	24	67 +
hops on one foot	54	72 +	18	75 +
14. Rides a tricycle using pedals	36	60	24	60
15. Skipping				
skips with one foot forward	48	72 +	24	67 +
skips, alternating lead foot	60	72 +	12	83 +

A-2. The Developmental Progression of Specific Fine Motor Skills

Motor Skill	Age of Onset (in months) Normal	Down Syndrome	Difference in Months	% of Norm Rate
1. Cube grasping				
insure cube grasp	5	6	1	83
grasps wand with palm of hand	6	7	1	86
stacks two cubes, one on top of the other	15	24	9	63
2. Retains rattle, holds onto rattle without immediate release	6	10	4	60
3. Transfers dangling ring or cube from one hand to the other	7	11	4	64
4. Pellet grasping				
grasps pellet by use of thumb and finger in a scissors-type movement	9	14	5	64
picks up a pellet using the thumb and finger	12	21	9	57
5. Turns pages in books				
turns pages in a book; usually two or three at a time	18	24	6	75
turns pages of a book one at a time in either direction	24	42	18	57
6. Basic writing and drawing				
imitates circular stroke after demonstration	24	54	30	44
holds a crayon by fingers in an adult fashion when drawing	30	42	12	71
imitates vertical and horizontal stroke	30	60	30	50

A-2. The Developmental Progression of Specific Fine Motor Skills (continued)

Motor Skill	Age of Onset (in months) Normal	Down Syndrome	Difference In Months	% of Norm Rate
imitates drawing of a cross	36	60	24	60
copies a drawing of a square	54	72 +	18	75 +
7. Unbottons coat or shirt	36	72 +	36	50 +

APPENDIX B

Sequenced Activities to Develop Each Terminal Landmark

1. Sequenced Activities to Develop Each Terminal Gross Motor Landmark

2. Sequenced Activities to Develop Each Terminal Fine Motor Landmark

B-1. Sequenced Activities to Develop Each Terminal Gross Motor Landmark

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Gross Motor Activities

Activities to Develop the Ability to Roll Over

General

1. Place infant on stomach and put toys with sound to infant's side and call to motivate him to roll over.
2. Roll infant to his side from stomach, leading with top arm and leg. Complete turn until on back. Gradually reduce amount of help.
3. Place infant on your stomach and help him roll off you.
4. Place infant on blanket and gently raise one end of the blanket, rolling him out.
5. Place infant on back. Let infant observe a mobile. Then place him on his stomach and encourage him to roll over.
6. Place infant partially on side with pillow supporting elevating one side of his body.

Rolls from back to stomach

1. Position infant on his back and change his center of gravity for rolling, bring over his top arm and leg and rotate head; complete roll until on stomach. Tuck his lower arm into his side to keep the arm from being caught underneath him as he rolls. Gradually reduce the amount of help. Repeat going the opposite direction.
2. While lying on your back, place infant on your stomach and help him roll off you, from his back to stomach.
3. Place infant on blanket and gently raise one end of the blanket, thus rolling the infant out, from back to stomach.
4. Place infant on back. Use favorite toy near face and hands, encouraging him to reach. Then gradually move toy to one side encouraging infant to follow with eyes and head. Next help infant turn over to get the toy.

Activities to Develop the Ability to Rest Body Weight on Hands

1. Place infant on a pillow where his arms and feet are not fully supported. Gradually reduce size of pillow, thus increasing his weight on elbows and forearms.

2. Hold bottle or toy with sound in front of infant, gradually raising object, thus encouraging him to follow with his head so he begins to push up with arms and hands.

3. Place towel around infant's chest and gently lift him up so his weight is partially supported on arms and legs. Gradually decrease the amount of support.

4. Place infant in crawl position and gently rock back and forth to stimulate postural response.

Activities to Develop the Ability to Sit

1. Place infant on stomach and speak to him to get his attention.
2. Passively elevate infant's head and rotate slightly.
3. Place infant on stomach and raise shoulders gently.
4. Move playpen frequently to give infant opportunity to observe people and other activities.
5. Tap infant on the opposite side from which he is looking.
6. Place infant on your lap in a sitting position in front of a miror. Encourage him to lean forward and pat the mirror.
7. Place favorite toy in infant's view, then slowly raise the toy as he raises his head.
8. Use bell, rattle, etc., to encourage infant to turn head and locate the sound. Place infant in different positions when performing this activity, i.e., seating him in infant seat, lying on his back, lying on his stomach.
9. Place infant in back or front carrier when shopping or on family outings.
10. Wiggle your fingers and encourage infant to grasp them, then raise him up. Be careful the infant does not fall backwards onto a hard surface. It is recommended that this activity be performed on a large pillow.
11. Have infant grasp a colorful scarf and pull him up to a sitting position.
12. Place infant on his back and move a noisy, colorful object from side to side over his head to get him to follow the object.
13. Place a moving mobile in crib or playpen.
14. Place infant in sitting position. Hold the infant's shoulders and move him forward, diagonally and sidewards until he begins to lose balance. Assist the infant to regain balance. Gradually withdraw assistance.

15. While supporting infant's neck and shoulders with one arm and holding infant's body with the other, balance infant on your knees. Gradually release support of neck and shoulders, then decrease support of infant's body so he is sitting on your knees without support. Be ready to assume support if infant loses balance.

16. Place infant in a corner for support. At first also place pillows on both sides of infant for additional support. Begin practice sitting session for short periods of time, 1 minute, then increase time gradually.

17. Place infant in a nearly upright position on your lap when feeding him a bottle.

18. Sit infant on a rug and place high pillow around him on all sides.

19. Place infant on the floor on his back. Hold his upper arms and slowly raise him up and down. As the infant's strength increases, move arm support toward his hands and increase the number of situps.

20. Place infant in sitting position on your lap, then carefully bounce him up and down. Sing a rhythm to him while performing the activity.

21. Place infant in a sitting position, then sit behind him to one side and talk to him.

22. Lay infant sideways then on stomach across your lap so he must rotate his head to look at you.

23. Place infant on a pillow with head and chest on the floor. While supporting infant at his waist, encourage him to raise his head and chest off the floor. Gradually add another pillow to increase the distance between the top of the pillow and the floor.

24. Place an inflatable ring around infant's waist for support. Gradually reduce the amount of air in the ring.

25. When you are sitting in the chair reading or watching television, sit infant against chair and between your legs and provide the infant with favorite toys. Your legs should provide the necessary support for the maintenance of the sitting position.

26. Place infant on his back. Put a favorite toy or small ball inside the front of diaper and encourage him to raise up and remove it.

27. While infant is sitting, place a toy just outside one leg so the infant must turn and lean to reach it.

28. Place infant in a sitting position and give him toys to play with such as a ball or balloon that requires two hands to hold them.

29. Play games such as patty-cake or peek-a-boo while sitting.

30. Seat infant inside toys that rock, but do not tip over.

31. Place infant 1-2 inches from a wall or a corner of a couch, giving the infant no support. Use objects that attract infant's attention. Encourage him to reach for the object and attempt to maintain balance.

32. While infant is sitting between your legs, lean infant in many directions.

33. Get infant to reach and retrieve favorite toys by leaning and righting himself or dangle toys to get infant to lean over and pull on them without falling over.

34. Seat infant in highchair for meals.

35. Set infant in front of a small toy box, have him lean forward to pick up toys.

36. Have infant grasp a colorful handkerchief while in a sitting position and pull him sideward and forwards encouraging him to re-erect himself.

Activities to Develop the Ability to Stand

1. While sitting on your lap facing you allow infant to push up with his knees as you support him up under his arms.
2. Place hand around infant's waist and bounce him so that his legs support him momentarily.
3. Hold infant in front of a mirror or window so he can observe himself. This will attract his attention and motivate him to continue activity.
4. Encourage infant to let go of your thumb and stand alone for a few seconds. Gradually reduce support.
5. Encourage infant to let go of your thumb and stand alone for a few seconds. Gradually increase the length of time he stands alone.
6. Encourage standing and holding onto furniture.
7. Attempt to get infant to let go of furniture and stand without support by placing a favorite toy just beyond his reach.
8. Place infant's bottle, some food, or a favorite toy on the edge of a table so the infant must stand to reach it.
9. When sitting, playing or reading to the infant, have him stand between your legs which will provide support for the standing position.
10. Place the infant's favorite toy on a low table so he can reach it from a kneeling position.
11. When infant is in his crib or playpen, show him how to reach up and grasp the top of the sides of the crib or playpen. Also hand him a favorite toy at the level of the top of the sides of the crib or playpen.
12. Place dish towel around infant's chest and under arm pits. While standing behind him grasp towel close to infant's body and support his body weight. Gradually reduce the amount of support and move grip on the towel farther away from the body.

13. While you are in a standing position, stand infant on your thighs, supporting him at his thighs. Let go momentarily. Gradually increase the time without support. Also move infant backward and forward and side to side.

14. Hold infant in a standing position on a bed and assist him in bouncing.

15. Have infant grasp onto a small hula hoop, then move the hoop around.

16. Place toys on a low table and play with them.

17. Stand infant in a corner and play games, such as, patty-cake, so-big and peek-a-boo. Gradually increase the distance he stands from the corner.

Activities to Develop the Ability to Creep

General

1. Have infant do bicycle-type exercises with legs.
2. Exercise arms and legs while bathing or changing diapers.
3. Place infant in creeping position and gently rock back and forth.
4. Place infant in a face down position on a pillow so that his arms and feet are not fully supported and let him play.
5. Dangle favorite toy in front of infant. Encourage him to raise his head higher and higher so he begins to push with arms and hands.
6. Place infant into a puppy dog position (legs tucked underneath him, with some weight supported by extended arms). Rock the infant back and forth.
7. Place infant in creeping position. Move right arm forward, then push left leg forward, then move left arm forward, then push right leg forward. Repeat this sequence.
8. Place a desired object out of reach of infant so he must creep to reach it. Hold infant at the hips to aid him in assuming a creeping position.
9. Put infant in a scooter which supports his body weight and have him propel himself.
10. Place infant on a blanket or mat for at least one hour a day, allowing him to explore rolling and creeping.
11. Attempt to have infant retrieve objects, first at a very close range then increase the distance.
12. Once the infant can crawl on a level surface, provide obstacles to climb around and over. Gradually increase heights until equivalent to a step.

13. Dress infant in clothes that allow freedom of movement.

14. Place toddler on hands and knees on the stairs. Get down with the toddler and attempt to help him up the stairs, using alternate extension of opposite arm and leg pattern.

15. Place toddler at the bottom of the stairs. You sit about four steps up. Dangle the toddler's favorite toy or food. Gradually increase the number of steps the toddler must creep to reach the toy or food.

Activities to Develop the Ability to Walk

General

1. Place mirror on couch so the infant can look into mirror when standing.
2. Place infant in front of a low window which he may look out when standing.
3. Place infant's chest of drawers next to crib so the infant must stand to take his favorite toys off the chest.
4. While infant is standing with support, move his legs at the knees in a side-step, or place a toy out of reach to encourage side-stepping to reach toy.
5. Have infant push a baby buggy.
6. Place favorite toys or food on tables where the infant can reach them. Help infant up using your fingers and try to get him to take a step or two to each table. Give verbal praise. Let infant stand against table and eat or play with toy.
7. Use Jolly Jumper or mini-trampoline to build leg muscles.
8. Stand behind infant holding his hands and walk infant.
9. Place brightly colored booties with bells on his feet so they will ring when he steps.
10. Place infant on back and help him move legs like he was riding a tricycle.
11. Place toddler between two chairs and gradually separate the chairs so that he must take a step(s) to go from one chair to the other. If toddler moves too fast and is unable to maintain balance or is unable to control stopping and starting, give verbal or extrinsic reward when he walks at the correct pace or stops at the appropriate times.
12. Allow the toddler the opportunity to push a chair across a smooth surfaced floor.

13. Hold onto toddler's shirt for support and gently slide one leg at a time forward. Gradually decrease the support. This activity can also be done by using a dish towel placed under toddler's arm pits instead of holding his shirt.

14. Walk over, in, around, through, up and down objects. Walk on rough, smooth, wet, dry, hard, soft, even, and uneven surfaces.

15. Place footmarks on floor with the distance between them at normal stride for toddler. Gradually decrease the length and width of stride. Also, place feet so they go to the left or right.

16. Repeat activity number fifteen with hands on hips.

17. Repeat activity number fifteen but walk to the end of the footmarks and bending down pick up an object.

18. Provide pull toys that make sound.

19. Play games such as chase, tag, hide and seek.

20. Use music, clapping, verbalization to speed up the toddler's pace.

21. Use dramatization: running like a horse, dog, mouse.

22. Provide open space for running.

23. Develop obstacle courses for the toddler to run through, walking through it first. If toddler can master an obstacle course of two or three obstacles add more, make them more difficult, and vary direction. Practice running fast, slow, then fast.

Walking Up and Down Stairs

Upstairs

1. Help toddler hold railing with one hand and hold your hand with his other hand. Then eliminate your support but stand behind him.
2. Provide opportunity to practice climbing stairs with help as well as incentives.
3. Practice walking up curbs holding onto toddler's hand.
4. Move toddler's legs up and down in a marching fashion. Try this activity to music.
5. Place colored items on stairs that match color of toddler's socks. Ask toddler to match the color of a sock to a piece of colored cloth on the next step. Increase the number of stairs the toddler must match and gradually remove the visual cues.
6. Demonstrate the alternating walking pattern.
7. While child holds onto the rail, move the child's feet in the correct movement pattern.
8. Place footprints made out of colored cloth (i.e., green cloth for right foot prints and red for left foot prints). You could also match the colored cloth with socks the child is wearing by putting a green and red sock on the child. Gradually remove visual cues.

Downstairs

1. Provide opportunity to practice walking downstairs with help as well as incentive.
2. Stand behind toddler holding his hands and walk downstairs the last few steps from bottom. Lift his arm higher on the side he is stepping down on. Gradually increase the distance and decrease assistance. Use some type of incentive at the bottom of stairs. Then help the toddler to hold railing with one hand.

3. Place colored items on stairs that match the color of the toddler's socks. Ask toddler to match the color of a sock to a piece of colored cloth on the next step. Increase the number of stairs the toddler must match and gradually remove the visual cues.

Walking on Balance Beam

1. Provide a narrow boundary with lines or thin rope, or a 4" wide piece of heavy carpeting. Have the child attempt to walk within the boundaries.

2. Provide balance beams of different widths (2", 4", 6") for the child to practice walking sideways, frontwards, and frontwards heel-to-toe. Start with the widest and gradually decrease the width. Gradually increase the height of beam.

3. Other balance activities include:
   a. Walking while balancing objects on hands and/or head,
   b. Walking over obstacles on the balance beam, and
   c. Trying activities with eyes closed.

4. Try activities one and two without shoes, first holding a hand, then just a finger, then just standing next to him.

5. Walk with two cups of water in hand or bean bags on head. Walk carrying a spoon with a ping pong ball in it.

6. Place a mirror facing one end on the balance beam which allows child to view his own movement.

7. Provide child opportunity to walk on tin can stilts beginning with cans that are wide-based and low to ground and gradually decrease base and increase height At times, stand behind the child to help him if needed Many times you may have to mechanically take the child through the basic movement.
   a. Walk with stilt on preferred foot.
   b. Walk with stilt on non-preferred foot.
   c. Using both cans attempt to maintain balance.
   d. Walk forward, sideways, and backward.
   e. Set up an obstacle course.
   f. Replace cans with wooden stilts and try activities of "e".

Activities to Develop the Ability to Seat Self in Small Chair

1. Purchase or obtain a chair for the toddler that is easy for the toddler to slide on and off of. Place chair in area where toddler plays so he identifies it as his chair. Ask the toddler to sit in his chair or put him in it.

2. Give toddler an opportunity to practice a variety of ways of getting on and off his chair as well as attempting other types of chairs (i.e., adult chairs).

3. Place a large chair next to a toddler's chair. Sit in the large chair then point to the small chair and ask toddler to sit like you.

Activities to Develop the Ability to Throw a Ball

1. Provide a variety of balls of different sizes and textures for toddler to explore.
2. Place your hand over toddler's, squeeze ball, and then release it. (A ball not much larger than the toddler's hand is best).
3. Stand behind toddler and guide his hand through the throwing motion, throwing the ball to another person or into a container.
4. Wad up paper and throw them at a wall target or have a paper fight.
5. Cut out pictures of zoo animals and glue them on a piece of strong cardboard. Pretend that the toddler is feeding the animals by throwing waded up paper balls, fluff balls, and sponge balls at the pictures. Make the noise of the animal he fed. Gradually increase the distance the toddler must throw food as his skill improves.
6. Roll old socks into a ball by starting at the toe. Then throw sock balls into a box, pan or wastepaper basket.
7. Throw ball up into the air and catch it or, let it bounce then catch it.
8. Practice throwing against a wall, with a target, pitch-back, or a child's basketball net. As skill improves gradually increase distance. Throw ball into wastepaper basket or small box.
9. Attempt to knock over milk cartons or bleach bottles by throwing a ball at them.
10. Throw ball over objects of varying heights and distances from child.
11. Throw bean bags through small target.
12. Increase the quality of form, force, and accuracy of all throwing activities.

13. Explore the skill of throwing.
    a. How high can you throw a ball and still catch it?
    b. Can you roll a ball to a partner?
    c. How many body positions can you be in and still throw the ball?
    d. How many ways can you throw a ball? (1 hand, 2 hands, chest pass?)
    e. How slowly (fast) can you roll a ball?
    f. Can you throw a ball and make it go between your partner's legs?
    g. Show me the best way to throw a ball fast and straight.

14. Have the child roll a ball down an incline and follow with his eyes.

15. While child is sitting, have him drop bean bags into a large dish or pan. As the child's skill increases decrease the size of dish or pan and increase the distance he must throw.

Activities to Develop the Ability to Kick a Ball After Demonstration

1. Allow a toddler to kick the ball by himself. Vary the size of the ball.

2. Have the toddler walk up and kick a stationary ball. Gradually increase speed at which the toddler approaches the ball.

Activities to Develop the Ability to Squat While Playing

1. Encourage squatting and recovering to standing position by:
   a. Placing the toddler next to a table lower than arm's length.
   b. Placing his favorite toy on floor next to him.
   c. Gradually increasing the distance between toddler's reach until he must squat and then raise.
   d. Holding both of the toddler's hands while standing, gradually place him in squatting position.

Activities to Develop the Ability to Jump

General

1. Stand next to child and demonstrate a jump. Then hold child's hand and jump with him. Continue until child is confident and let child jump alone.
2. Ask child to imitate you while you jump over a chalk line or a rope.
3. Jump from one color shape to another.
4. Encourage child with your assistance to jump off curbs or stairs. Gradually increase height, make sure child puts his arms out to sides for support, and bends knees on landing.
5. Once child can jump in place, have him stand on bottom step, put your arms out, tell him to jump and move up and down.
6. Have child jump off low structures (i.e., cardboard boxes).
7. Jump to rhythm of "jump-jump".
8. When child is able to jump over a low obstacle, provide him, with higher obstacles such as hula hoops, tires, or a jump rope gently swinging.
9. Jump over a rope. If possible, use a trampoline to aid the child to raise both feet at the same time. Also, let child observe the act and demonstrate. "Simon Says" also is good to get them to follow a movement.
10. Jump over two ropes next to each other, then gradually increase the distance between the ropes.
11. Have child jump from height of six inches and then twelve inches.
12. Have child swing arms in direction of jump and lean forward to cover a greater distance, make sure he pushes off against floor, and bends knees slightly when landing.
13. Jump and land with knees bent.

14. Run, jump, and land.

15. Jump, land, and jump again.

16. Jump, turn, and land.

17. Suspend ball on string and have child attempt to jump and touch it with his hand. Gradually increase height.

18. Suspend ball on string and have child attempt to kick it with preferred and non-preferred feet. Gradually increase height of the ball.

19. Tie a thin string between two chairs. Have the child attempt to jump over it from a standing position then run and jump over it. Gradually increase height.

20. Explore the skill of jumping.
    a. How can you get both feet off the ground?
    b. How far (soft, hard, high, etc.) can you jump?
    c. Can you change the shape of your body while in the air (tall, short, round)?
    d. How many ways can you jump and clap your hands?
    e. How would you jump if you were a frog (squirrel, kangaroo, cat)?

21. Jump up and down, landing in the same spot.

22. Jump over a stationary spot. Now face a rope turner and attempt to jump up and down while the rope is turning. Start rope turning slowly. Make sure the child follows the rope and jumps on the balls of his feet with knees slightly bent.

23. Swing rope completely over child's head while he attempts to jump it.

Activities to Develop the Ability to Ride a Tricycle

1. Place child on his back and passively move him in a scissor-like motion. Have child apply pressure against your hands with his feet then bend his knees and rotate his feet.

2. Place child on tricycle, hold his feet or secure him on the pedals.

3. Apply pressure to child's knees to help him turn pedals, then move behind child and push and pull him.

4. Practice pedaling for distance.

5. Practice turning by following lines made by tape, chalk, or string.

6. Develop traffic route.

Activities to Develop the Ability to Skip

One Foot lead (Galloping)

1. Demonstrate skill to the child. This skill involves sliding foot forward (will remain lead foot) then bringing back foot just in off the lead foot with a short leap to back foot, repeat.

2. Hold child's hand and perform together.

3. Practice to a musical instrument or music.

4. Explore the skill of galloping.
   a. Gallop with one foot leading then the other.
   b. How many directions can you gallop?
   c. What can you do with your arms when you gallop?
   d. How heavy (light) can you gallop?
   e. How does a horse gallop?
   f. Can you make yourself very small (tall) when you gallop?
   g. Can you gallop a square? Try a small square?

5. Try activities 3 and 4 with non-preferred foot in the lead.

6. Gallop around obstacles made of furniture.

7. Gallop backwards.

Alternate Lead Foot

1. Demonstrate skill at different speeds. Show the child that you step forward with one foot and hop at the same time, swing the opposite foot forward and hop on this foot.

2. Practice skipping with the child holding his hand so he feels the rhythm.

3. Practice with music.

4. Explore the skill of skipping.
   a. Can you skip slow (fast, heavy, light)?
   b. What can you do with your arms when you skip?
   c. How high (low) can you skip?
   d. Skip in different directions and avoid collisions?
   e. Can you skip in a square pattern?
   f. Can you skip backwards?

5. Skip forward for 15 to 20 feet.

6. Skip around obstacles made of furniture.

B-2. Sequenced Activities to Develop Each Terminal Fine Motor Landmark

Fine Motor Activities

Activities to Develop Grasp

Cube

1. Provide grasping activities such as a rattle, bell, rings, etc. Place your hand over his and grasp. Gradually let go of his hand to see if he will retain object.
2. While bathing infant or during water play, pull wash cloths through hands or squeeze sponge into hand, etc.
3. When infant begins to reach with a crude grasp, give infant objects which are small enough to fit in his palm.
4. Encourage infant to reach and grasp his toes, feet, fingers, and clothing.
5. Place balloons or colorful handkerchiefs and ribbons around wrists and encourage him to shake his arms.
6. Provide some type of finger food at meals.
7. Have infant grasp four fingers and shake them in all directions. Eventually have infant grasp a towel and do the same activity.
8. Rub infant's palms.
9. Place both hands together and pat them.
10. Pull clothes with different textures across infant's palm and through index finger and thumb.
11. Grasp the infant's hands and place his hands around objects with different colors, shapes, and textures. Then rub his hands on the object. Begin with fairly large objects and decrease the size.
12. Begin with fairly large objects and then decrease the size to objects which are small enough to fit in the palm of his hand and hence are easier to grasp. These might include small plastic blocks, a rattle with a small handle, or squeeze toys.

13. Encourage infant to grasp your fingers, pat your face, hands, etc.

14. Place varied size, shape, and textured toys in bathtub for water and sponge play. Let infant empty and fill objects in low containers (cake pan, plastic bowls).

15. Place a suction toy on the infant's high chair.

16. Tie colorful objects with different textures on a rope across the infant's crib and play pen.

17. When infant is sitting or lying on his stomach with a pillow or bolster under his chest, put a weighted toy, block tower, or suction rattle within his reach and demonstrate how to play with it.

18. Give the infant objects which are small enough to fit in the palm of his hand and hence are easier to grasp.

19. Encourage infant to reach and grasp toes, feet, fingers and his clothing as well as your fingers, hands and clothing.

20. Use baby bottle to get infant interested in touching objects. Place infant's hands around it and place your hands over it.

21. Use stuffed animals and dolls which are fun to touch, and have some exciting characteristics such as fur, hair, long ears, or tails. Place them near infant so that by moving around he will come in contact with it and will feel stimulated to touch it again and again.

22. Place small piece of fur on infant's stomach or in his lap to stimulate his interest to touch and play with it.

23. Dangle colorful, noisy toys in front of infant. Have him touch or hit at them.

24. Place small bells on infant's clothing such as sleeves, on the front of sweaters, on booties or shoes, or on wrists and ankles. When infant is active bells will ring and attract his attention to grasp and reach for them.

25. Tickle or scrape the sole of his foot while helping him to bring his foot up toward his head. Place his hand around it and help him to hand on to it. Withdraw your hand and observe if infant can hold grasp on his own.

26. Stimulate various body parts by tickling with a feather or string which will cause the infant to bring his hands to the place where the sensation occurs.

27. Allow infant in the kitchen to play with pots and pans. Add numerous other household objects.

28. Sit infant on the floor or on a low table. Using toys such as an empty paper towel roll or plastic rolling pin close within his reach. Show him how he can reach out and get the roll or pin. Gradually move the objects away so he must reach for them.

Pellet/Raisin Grasping

1. Show infant how to grasp and open snap-type clothespins. Begin with loose springs that are easy to open. Have infant pick them up by using his thumb and fingers. Place pins on stuffed toys and encourage infant to play by removing them from the toys.

2. Give infant small round objects to roll in his fingers (i.e., ball of playdough or plastic beads). Let infant squeeze the playdough balls with his fingers.

3. Place a large colorful sock over a hand and have the infant remove it.

4. Give infant opportunities to place toys in containers. Gradually decrease the size of the toys and the containers.

5. Place large buttons or poker chips on shag rug. Have infant pick them up. Next try this activity on a table top.

6. Have infant take raisins out of small raisin box.

Grasping and Transfer
Retains (wand)

1. Have infant to grasp your fingers as you pull him up.

2. While bathing infant or during water play activities pull washcloth through his hands and finger or place sponge in hand and squeeze. Encourage him to do it on his own.

3. Place varied size, shape, and textured toys in bathtub water for sponge play. Also, empty and fill objects in low containers (cake pan, plastic bowl). Provide push-pull toys.

4. Set up an "infant proof" environment where infant may explore freely and where "no-no's and don't touch" are only occasionally necessary.

5. Hand small objects to the infant on his less favored side to stimulate him to transfer it to the hand with which he is more comfortable.

6. Put small objects on a flat, rough, or smooth surface i.e., a rug remnant on a table) and have infant pick them up. Gradually reduce the size of the objects.

Activities to Develop the Ability to Turn Pages in a Book

1. Put small flat objects partially buried in the sand, i.e., large buttons or cardboard disks, and have toddler pick them out of the sand using his thumb and index finger.

2. Have toddler turn pages of storybooks with plastic coated or cardboard pages. When toddler can turn thick cardboard pages, give him a book with paper pages.

3. Read story to the toddler and show him how to turn the pages as you read the story.

4. Give toddler old catalogues and magazines to play with.

5. Moisten finger tips, if needed for better grip.

6. Have toddler begin to anticipate storybook sequence.

Activities to Develop the Ability to Draw

Makes a Circular Stroke

1. Tell toddler to look as you scribble on the paper. Make sounds to go along with your strokes to attract toddler's attention. Now ask toddler to draw.
2. Help toddler to hold crayon but do not insist he hold it in his fingers. If toddler does not make any marks hold crayon with him and help him to make marks.
3. Give toddler frequent opportunities to scribble on large pieces of paper.
4. Do not force toddler to use one hand or the other.
5. Draw a circle and ask child to imitate.
6. Hold toddler's hand and assist him through movement.
7. Make a template of a circle to assist the toddler. Gradually decrease the width of template as toddler's skill improves.
8. Allow toddler to finger paint and do chalkboard activities.
9. Cover table with oil cloth. Place large pieces of crayon on table and let child scribble with varying colors.

Holds Crayon in Adult Fashion

1. Have a large crayon and a large piece of paper ready. Get a child interested in the objects by drawing lines on the paper. Ask him "Can you do it?". Hand him the crayon and let him experiment.
2. Tell child to look as you scribble on the paper. Make sounds to go along with your strokes to attract child's attention. Tell child to draw.
3. Help child to hold crayon but do not insist he hold it in his fingers.
4. If child does not make any marks, hold crayon with him and help him to make marks.

5. Give child frequent opportunities to scribble on large pieces of paper.

6. Continue procedure of demonstrating how to make a circle while child watches and have him imitate until most of his circles are accurate. Occasionally put stars or draw faces in his circles.

7. Show child a drawn circle which he has not watched being produced. Tell him it is a circle and to draw one like it. If he has difficulty doing this, let him trace over the model.

8. Do not force child to use one hand or the other.

9. Praise child for holding crayon in adult-fashion grasp regardless of whether he holds it too high.

10. Once child grasps crayon in adult fashion give him short pieces of crayons so he must hold them near the tip.

11. Gradually increase length of crayon, encouraging child to grasp it near the tip.

Draws Horizontal and Vertical Lines

1. Demonstrate a horizontal stroke. This stroke should be large. Praise child for his attempt to imitate.

2. Guide child's hand through movement.

3. Make a template to assist child. Gradually decrease width of template as child's skill improves.

4. Give child a piece of paper with incomplete horizontal lines (---). Demonstrate to child how to connect dots to make a horizontal line. Praise child for his attempts. Gradually reduce the number of dots and increase the distance between them.

5. Activities such as finger painting or drawing horizontal lines in the sand are great motivators. Also the use of crayons and colored markers will help.

6. Start with large pieces of paper and then gradually decrease the size.

7. Demonstrate a vertical stroke. Guide child's hand through the movement. Praise child for and attempt.

8. Make a template to assist child. Gradually decrease the width of template as child's skill improves.

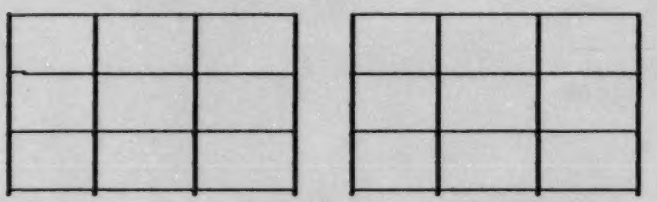
9. Give child a piece of paper with incomplete vertical lines. Demonstrate to child how to connect dots. Gradually reduce the number of dots and increase the distance between them.

10. Activities such as finger painting or drawing vertical lines in sand are great motivators.

11. Use crayons or water color markers as motivators to make vertical strokes.

Draws a Cross

1. Develop numerous vertical and horizontal patterns on a piece of paper. Guide the child's hands through the movement. Gradually decrease assistance.



1. Draw a cross for child to imitate. Label your drawing a block or box. Praise child for attempts.

2. Hold child's hand and assist him through movement.

3. Make a template of a cross to assist the child. Gradually decrease the width of template as child's skill improves.

4. Give child a piece of paper with incomplete cross. Demonstrate to the child how to connect dots to make a square. Praise child for his attempts. Gradually reduce the number of dots and increase the distance between them.

2. Develop a template of a cross and have the child trace it.

3. Demonstrate how to make a cross to the child. Afterwards have him try to copy yours with difference colored crayons. Then let him try to draw a cross just by looking at a cross already made.

Copies a Square

1. Draw a square for child to imitate. Label your drawing a square. Praise child for attempts.

2. Hold child's hand and assist him through movement.

3. Make a template of a square to assist the child. Gradually decrease the width of template as child's skill improves.

4. Give child a piece of paper with an incomplete square. Demonstrate to child how to connect dots to make a square. Praise child for his attempts. Gradually reduce the number of dots and increase the distance between them.

Activities to Develop the Ability to

Unbutton Coat and Shirt

1. Demonstrate to child how to unbutton clothes.
2. Purchase toys that have clothes with large buttons. Reward child for any attempt to unbutton the clothes.
3. Provide child with many opportunities to manipulate small objects in order to gain control over finger action and to increase accuracy of movement. Small beads, pennies, pegs, marbles, and buttons are well chosen objects.
4. To begin with have child handle large buttons, then as his manipulative skills increase, diminish the size to smaller and smaller ones. Also, at first have the child put objects through large openings, then gradually decrease their size.
5. Have child place small objects in specific places, i.e., beads on a string or in a small opening of a bottle neck, pennies through the slots of a piggy bank, pegs into the holes of a pegboard, and buttons through the slots of a plastic can lid.
6. Put one piece puzzles together.
7. Place button partially through a button hole and have child pull it out with his fingers. Gradually decrease the size of button hole or increase size of button. Also decrease the amount of button showing for him to pull through.
8. Using a piece of cloth with a button, and another piece with a button hole, demonstrate to the child how to push button in and pull out.
9. Try activities seven and nine with child's own clothes.
10. Try activities seven and nine with child's clothes on him.

11. The backward method to teach unbuttoning is:

Step A. Present buttoned piece of clothing to the child. Push button halfway through the slot or button hole. Direct child's hand to push the button all the way through. Thus the button becomes undone. Reinforce and praise the child.

Step B. Push the button just barely into the button hole. Direct child to complete the task.

Step C. Present to the child a buttoned piece of easy to manage clothing or a button frame. Ask him to unbutton. Demonstrate how to grasp button with one hand and to hold with the other hand the material on the side with the button hole. Have him complete unbuttoning task.

APPENDIX C

NATIONAL RESOURCES

NATIONAL RESOURCES

C-1. General Resources in the Area of Mental Retardation:

American Association on Mental Deficiency
5101 Wisconsin Avenue, N.W.
Washington, DC 20016

Association for Childhood Education International
3615 Wisconsin Avenue, N.W.
Washington DC 20016

Canadian Association for Retarded Children
149 Alcorn Avenue
Toronto 7, Ontario
Canada

Children's Bureau
Department of Health, Education and Welfare
Washington, DC 20007

Council for Exceptional Children
1920 Association Drive
Reston, VA 22091

Early Childhood Education - ERIC Clearinghouse
University of Illinois
Urbana, IL

International League of Societies for the Mentally Handicapped
c/o Heller School
Brandeis University
Waltham, MA 02154

Joseph P. Kennedy, Jr. Foundation
1701 K Street, N.W.
Suite 205
Washington, DC 20006

National Association for Retarded Citizens
2709 Avenue E East
Arlington, TX 76011
(Formerly the National Association for Retarded Children)

President's Committee on Mental Retardation
Washington, DC 20281

C-2. Resources in the Area of Down's Syndrome:

Down's Syndrome Congress
1640 West Roosevelt Road, Room 156E
Chicago, IL 60608
(Affiliate of National Association for Retarded Citizens)
A national organization of parents, professions and all persons concerned with Down's Syndrome of all ages by fostering the advancement of innovative approaches to research, prevention, and treatment, by developing broader public understanding and knowledge of the problems of Down's Syndrome, by helping parents and siblings, and by serving as a clearing house for gathering and disseminating information.

Down's Syndrome International
11 North 73rd Terrace
Kansas City, KS

National Mongoloid Council
Post Office Box 140
Park Ridge, IL 60068
A national organization of parents and professionals concerned with Down's Syndrome. The council publishes a newsletter entitled the "National Mongoloid Digest".

Parents of Down's Syndrome
c/o Montgomery Co. Association for Retarded Citizens
10730 Connecticut Avenue
Kensington, MD 20795

C-3. Resources in the Area of Special Physical Education:

American Alliance for Health, Physical Education, Recreation, and Dance
1900 Association Drive
Reston, VA 22091

There is a unit within the Alliance on programs for the handicapped which offers extensive services, information, and referrals.

Special Olympics
1701 K Street, N.W.
Washington, DC 20006

This organization is concerned with physical education training programs. These training programs culminate in the Spring with local, regional, state, and every four years an International Special Olympics. For information related to developing, implementing, or becoming part of the training programs write to the Special Olympics.

APPENDIX D

NATIONAL PERIODICALS

1. General Periodicals in the Area of Mental Retardation
2. Periodicals in the Area of Down Syndrome

D-1. General Periodicals in the Area of Mental Retardation:

American Journal of Mental Deficiency
American Association on Mental Deficiency
5101 Wisconsin Avenue
Washington, DC 20016

Closer Look
United States Department of Health, Education & Welfare
Box 1492
Washington, DC 20013

The Exceptional Parent
Psy-Ed Corporation
Room 700
Statler Office Building, 20
Boston, MA 02116

Journal of Exceptional Children
Jefferson Plaza
Suite 900
1499 Jefferson Davis Highway
Arlington, VA 22202

Education and Training of Mentally Retarded
1920 Association Drive
Reston, VA 22091

Journal of Special Education
1950 Street Road
Suite 408
Cornwells Hgts, PA 19020

Journal for Special Educators of the Mentally Retarded
179 Sierra Vista Lane
Valley Cottage, NY 10989

Mental Retardation
American Association on Mental Deficiency
5101 Wisconsin Avenue
Washington, DC 20016

Mental Retardation Abstracts
U.S. Department of Health, Education & Welfare
Social and Rehabilitation Service
Division of Mental Retardation
U.S. Government Printing House
Washington, DC

Mental Retardation and Developmental
Disabilities Abstracts
US Office of Human Development
Developmental Disabilities Office
330 Independence Avenue, S.W.
Washington, DC 20201

Mental Retardation News
National Association for Retarded Citizens
2709 Avenue E East
Arlington, TX 76011

PCMR Message
President's Committee on Mental Retardation
Washington, DC 20201

D-2. Periodicals in the Area of Down Syndrome:

Down's Syndrome
Insight Publishing Company, Inc.
501 Madison Avenue
New York, NY 10022

Down's Syndrome News
P.O. Box 1527
Brownwood, TX 76801

Sharing Our Caring
P.O. Box 400
Milton, WA 98354

The Exceptional Parent
P.O. Box 4944
Manchester, NH 03108

Down's Syndrome Papers & Abstracts for Professionals
Children's Brain Research Clinic
2525 Belmont Road, N.W.
Washington, DC 20008

or

10404 Leslie Court
Silver Spring, MD 20902

APPENDIX E

DOWN SYNDROME PARENT GROUPS

Down Syndrome Parent Groups

Association for Children with Down Syndrome (Mongoloid) Inc.
P.O. Box 187
East Meadow, NY 11554
The purpose of this organization is to work with Down Syndrome children and their families to lead them to a better understanding of Down Syndrome. Other goals are to help parents become aware of the educational rights of their children and to create public understanding of Down Syndrome. This organization further provides parent and sibling counseling, medical and developmental evaluations, and a book and toy lending library.

Down Syndrome Association of St. Louis, Inc.
415 Kirkham Avenue
Webster Groves, MO 63119
The purpose of this organization is to keep themselves informed and the public aware of the needs and potential of Down Syndrome citizens.

Down's Syndrome Parents' Group
c/o St. Paul Association for Retarded Citizens
529 Jackson Street
St. Paul, MN 55101
The major objective of this organization is to provide support and information for parents of Down's Syndrome children.

National Association for Down's Syndrome
Box 63
Oak Park, IL 60303
This is a non-profit organization of over 1,500 parents, friends and professionals interested in the individual with Down Syndrome. They work together to acquire and disseminate and share knowledge.

Parent Assistance Committee on Down Syndrome
Westchester Association for Retarded Children
121 Westmoreland Avenue
White Plains, NY 10606
The purpose of this committee is to assist parents of Down's Syndrome individuals of all ages. PACDS also offers a continuing series of educational programs and a resource center.

Parents of Children with Down Syndrome, Inc.
P.O. Box 35268
Houston, TX 77035
A non-profit organization of parents, friends, relatives, or professionals who express an interest in Down Syndrome. This organization provides parent counseling, lending book and toy library, newsletter, Speaker's Bureaus, and public service announcements.

Parents of Down Syndrome Children
Montgomery County Association for Retarded Citizens, Inc.
10730 Connecticut Avenue
Kensington, MD 20795
The main purpose of the organization is to provide an information packet to help parents through that first period of adjustment.

Other Parent Groups:

Monogloid Children's Association
14867 Stadler Road
Sterling Heights, MI 48078

Mongoloid Development Council
11 North 73rd Terrace
Kansas City, KS 66111

Mongoloid Development Council
307 Bender Avenue
Roselle Park, NJ 07204

Monday's Mothers
349 Fitch Avenue
Monterey, CA 93940

Parents of Mongoloid Children Committee
16470 Ronnies Drive
Mishawaka, IN 46544

Richmond Parents for Down Syndrome Children
28 Mada Avenue
Staten Island, NY 10310

APPENDIX F

SOURCES FOR EDUCATIONAL MATERIALS AND EQUIPMENT

SOURCES FOR EDUCATION MATERIALS AND EQUIPMENT

Educational Toys and Games:

American Toy Institute
200 Fifth Avenue
New York, NY

Association for Childhood Education International
3615 Wisconsin Avenue, N.W.
Washington, DC 20016

Childcraft (Education Corp.)
P.O. Box 94
Bayonne, NJ 07002

Community Playthings
Department 44
Rifton, NY

Creative Playthings
Princeton, NJ 08540

A. Daigger and Company
Educational Teaching Aids Division
159 West Kinzie Street
Chicago, IL 60610

Developmental Learning Materials
3505 North Ashland Avenue
Chicago, IL 60657

Educational Activities
P.O. Box 392
Freeport, NY 11520

Ideal School Supply Company
Oak Lawn, IL 60453

Playskool Toys
3720 North Redzie Avenue
Chicago, IL

Show'N Tell Inc.
109-111 West Gay Street
West Chester, PA 19380

Vermont Wooden Toy Company
Old High School Building
Waitsfield, VT 05673

Playground and Gymnasium Equipment:

American Athletic Equipment
American Avenue
Jefferson, IA 50129

Atlantic Cordage and Supply Corporation
243 40th Street
Brooklyn, NY

Cosom Safe-T-Play Products
6030 Wayzatta Boulevard
Minneapolis, MN 55416

Educational Media, Incorporated
3191 Westover Drive, S.E.
Washington, DC 20020

Goldberg's
902 Chestnut Street
Philadelphia, PA

Groher Industries Incorporated
35-47 31st Street
Long Island City, NY 11106

Jayfro Corporation
Hartford Turnpike
P.O. Box 400
Waterford, CT

Lind Climber Company
807 Reba Place
Evanston, IL 60202

Play-Learn Products
2298 Grissom Drive
St. Louis, MO 63141

Playmate Playground Equipment
The Delmar E. Harris Company
Concordia, KS

J.A. Preston Corporation
71 Fifth Avenue
New York, NY 10003

Raven Industries Incorporated
Box 1007
Sioux Falls, SD 57101

Playground and Gymnasium Equipment: (continued)

Scott Paper Foam Outlet
Essington, PA

Seamless
Division of Dart Industries, Incorporated
New Haven, CT 06503

Shield Manufacturing, Incorporated
9 St. Paul Street
Buffalo, NY 14209

Spaulding and Brothers, Incorporated
4850 North Harlem Avenue
Chicago, IL 60658

Sterling Recreational Products
7 Oak Place
Montclair, NJ 07042

R.D. Titus Gym Scooter Company
Winfield, KS 67156

Things From Bell
P.O. Box 26
Homer, NY 13077

Voit, Incorporated
29 East Rawis Road
Des Plaines, IL 60018

Records:

Children's Music Center, Incorporated
5373 West Pico Boulevard
Los Angeles, CA 90019

Educational Activities, Incorporated
Box 392
Freeport, L.I., NY 11520

Hoctor Educational Records
Waldwick, NJ 07463

Kimbo Educational Records
P.O. Box 246
Deal, NJ 07723

Summy Birchard Company
Evanston, IL

Pool Materials and Equipment:

Kimbo Educational Records
P.O. Box 246
Dean, NJ 07723

Ocean Pool
Ocean Pool Supply Company
Stepar Place
Huntington Station, L.I., NY 11746

Stark's Aquatic Company
35126 Cannon Road
Chargin Falls, OH 44022

APPENDIX G

BOOKS AND PAMPHLETS

1. General Books and Pamphlets in the Area of Mental Retardation
2. Books, Articles, and Pamphlets in the Area of Down Syndrome
3. Books in the Area of Physical Education
4. Books and Pamphlets in the Area of Special Physical Education
5. Books and Pamphlets in the Area of Inexpensive and Home Made Physical Education Equipment

BOOKS AND PAMPHLETS

G-1. General Books and Pamphlets in the Area of Mental Retardation:

A Selected Annotated Bibliography for Parents and Siblings of Mentally Retarded Individuals. National Association for Retarded Children, 209 Avenue E East, Arlington, TX 76011.

Blanton, E. A Helpful Guide in the Training of a Mentally Retarded Child. National Association for Retarded Children, 2709 Avenue E East, Arlington, TX 76010.

A helpful guide for parents, with a section on the Down's Syndrome child.

Buckler, B. Living With a Mentally Retarded Child: A Primer for Parents. Hawthorn Books, Inc., 70 Fifth Avenue, New York, NY 10011. Dutton, 1971.

Chapters on diagnosis, home management and training, education and social relations, and job placement. Also listings, by state, of diagnostic centers and residential facilities and two bibliographies are presented.

Garton, M.D. Teaching the Educable Mentally Retarded. (3rd Ed.) Springfield, IL: C.C. Thomas, 1974.

This book provides numerous suggestions, examples, and methods for teaching the educable mentally retarded.

Hunter, M.H., Schueman, H., and Friedlander, G. The Retarded Child From Birth to Five. New York, NY: Ty Crowell, 1972.

This book provides information related to the areas of early identification and intervention, comprehensive interdisciplinary evaluation, treatment programs, and the role of the family in the progress of the child.

Hutt, M.L. and Gibby, R.G. The Mentally Retarded Child: Development, Education and Treatment. (4th Ed.) Boston, MA: 1979.

This text presents the latest research findings, training methods, educational philosophy, and social planning with respect to mental retardation.

Koch, R. and Dobson, J.C. (Eds.) The Mentally Retarded Child and His Family: A Multidisciplinary Handbook. New York, NY: Brunner Imazel, 1976.

Excellent resource text in the area of mental retardation.

Koch, R. and Koch, K. Understanding the Mentally Retareded Child. New York,NY: Random House, 1975.

This book explains in easily understood terms the causes, treatment, and preventive care now available with an excellent chapter on Down Syndrome.

Kolstoe, O.P. Teaching Educable Mentally Retarded Children. (2nd Ed.) New York, NY: Holt Rinehart and Winston, 1976.

This book presents a chapter devoted to motor skills and recreation of educable mentally retarded children. This chapter is divided into the following sections: testing mobility, teaching mobility, teaching swimming, and recreation.

Linde, T.F. and Kopp, T. Training Retarded Babies and Preschoolers. Springfield, IL: Charles C. Thomas, Publishers, 1974.

This book presents methods to train a retarded infant or toddler in areas of speech and language development, self-help skills, and basic fine and gross motor activities.

Mental Retardation Publications of the Department of Health, Education, and Welfare. Available from U.S. Department of Health, Education, and Welfare; Office of the Secretary, Secretary's Committee on Mental Retardation, Washington, D.C. 20201

Numerous publications are available at minimal expense. These publications can be requested.

Perry, N. Teaching the Mentally Retarded Child. (2nd Ed.) New York, NY: Columbia University Press, 1974.

Comprehensive book related to the instruction of the mentally retarded child within the school setting. Some of the chapters are devoted to general physical condition and motor development, gross motor skills, and an index of sports and games.

President's Committee on Employment of the Handicapped. Committee on Recreation and Leisure Publications, Washington, D.C. 20201. The following publications are available from the President's Committee:

a. Recreation is for Handicapped People. A six-page brochure discussing recreation's potential to handicapped people and how to locate leisure opportunities including a listing of some of the major organizations that offer recreational services to handicapped people.

b. Facts on Employment of the Handicapped in the Recreation, Park, Leisure, and Cultural Services. Discussions about where and how handicapped people can be successfully employed in the leisure fields plus several successful case studies are presented.

c. Report of the National Forum on the Recreation and Park Needs of Handicapped People. A rather complete review of twelve major problems that face both handicapped people and municipal park and recreation professionals in this area with suggested solutions to those problems.

d. The Massachusetts Model. A special edition of the CRL newsletter reporting on the successful alignment of state park and recreation agencies with organizations serving handicapped people under the aegis of the Massachusetts Governor's Commission on Employment of the Handicapped. A good study on how to organize all concerned at the state and local levels.

e. List of Guidebooks for Handicapped Travelers. A bibliography listing the availability of guidebooks for handicapped people to over 200 cities in the U.S., Canada, and Europe.

f. Cultural Festival of the Handicapped. A special issue of the CRL newsletter describing the "how to" of organizing and conducting a cultural festival for the handicapped.

g. Trends. A special issue on designing parks and programs that include handicapped people.

h. National Park Guide for the Handicapped. Available from the Superintendent of Documents, Government Printing Office, Washington, DC 20402, Stock number 2405-0286.

i. Highway Rest Areas. A listing of the accessible rest stops on our Nation's Interstate Highway System.

j. State and Federal Architectural Barriers Laws. A listing of each state's law on accessibility for buildings and facilities constructed in whole or part with public monies.

k. Newsletter of the Committee on Recreation and Leisure. A bi-monthly publication listing resource information, new developments, etc., in the field of recreation and park planning for handicapped people.

Robinson, N.M. and Robinson, H.B. The Mentally Retarded Child. (2nd Ed.) McGraw, 1976.

The authors review the historical and recent developments in special education of the mentally retarded children.

Secretary's Committee on Mental Retardation. Mental Retardation Publications (Bibliography). Washington, DC. Secretary's Committee on Mental Retardation (U.S. Department of Health, Education, and Welfare), 1971.

Selected Reading Suggestions for Parents of Mentally Retarded Children. Compiled by the Office of Child Development, Children's Bureau. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

Smith, R.M. Clinical Teaching (2nd Ed.) New York: McGraw-Hill Book Company, 1974.

The book offers a complete chapter on the perceptual motor performance of the mentally retarded.

Stephens, B. (Ed.) Training the Developmentally Young. New York: The John Day Company, 1971.

This book discusses in detail methods of developmental appraisal and areas and methods of training the developmentally young.

Waite, K.B. The Trainable Mentally Retarded Child. Springfield, IL: Charles C. Thomas, Publisher, 1972.

This book offers information on clinical types of mental retardation; physical, mental, and emotional growth of children; learning in retarded and normal children; discipline and classroom management; physical and motor development; and daily living routines for teaching the trainable mentally retarded child.

G-2. Books and Pamphlets in the Area of Down Syndrome:

Benda, C.E. The Child With Mongolism (Congenital Acromicria). New York, NY: Grune & Stratton, 1960.

While this text is over a decade old, it still contains worthwhile information. Some of the topics discussed are the history, frequency, terminology, diagnosis, physical development and principles of treatment.

Brinkworth, R. and Collins, J. Improving Mongol Babies and Introducing Them to School. The National Society for Mentally Handicapped Children, Northern Ireland Region, 230 Ormeau Road, Belfast, BT 7 2 FZ, Ireland.

This is a guide for parents of Down's Syndrome infants; helpful suggestions on health care and feeding, sensory stimulation and exercise, language development, and reading.

Centerwall, S.A. and Centerwall, W.R. An Introduction to Your Child Who Has Mongolism.

This pamphlet provides basic information on Down's Syndrome for new parents.

Crome, L., Cowie, V.A. and Slater, E. A statistical note on cerebullar and brain-stem weight in mongolism. Journal of Mental Deficiency Research, 1966, 10, 69-72.

Dicks-Mireaux, J.J. Development of intelligence of children with Down's Syndrome; preliminary report. Journal of Mental Deficiency Research. 1966, 10, 82-93.

DeLaCruz, F.F. and Gerald, P. Trisomy 21 (Down's Syndrome). Baltimore University Park Press, nid.

Down's Syndrome Parent Information Kit. MCARC, 11212 Norris Drive Silver Spring, MD 20902.

This kit is designed primarily to give new parents of Down's Syndrome babies practical information and convey to them that a Down's Syndrome child is far from hopeless.

Facts About Mongolism for Women Over 35. National Institute of Child Health and Human Development, Landow Building, Room C-708, 7910 Woodmont Avenue, Bethesda, MD 20014, 1973.

This pamphlet presents in question and answer form, Down's Syndrome and what it will mean to the affected child and his family and the risks involved for having such a child.

Horrobin J. and Rynders, J. To Give an Edge: A Guide for New Parents of Down's Syndrome (Mongoloid) Children.

This booklet presents both sides of the many questions and issues confronted by new parents of Down's Syndrome babies. This booklet contains excellent material on this subject for professionals as well as parents.

Koch, R. and DeLaCruz, F.F. (Eds.) Down's Syndrome (Mongolism): Research, Prevention and Management. New York: Brunner Mazel, 1975.

Proceedings of the first annual meeting of the Down's Syndrome Congress. Covers numerous topics including developmental progress in Down's Syndrome, principles and methods of early intervention, and infant stimulation.

Mother to Mother. Mothers of Mongoloid Children. National Association for Down's Syndrome, 628 Ashland Avenue, River Forest, IL 60305, 1972.

Pitt, D. Your Down's Syndrome Child...You Can Help Him Develop From Infancy to Adulthood. National Association for Retarded Citizens, P.O. Box 6109, Arlington, TX 76011, 1974.

Briefly describes general, parental expectations of their Down's Syndrome child from infancy to adulthood.

Smith, G.F. and Berg, J. Down's Anomoly. Little, Brown & Company, 200 West Street, Waltham, MA 02154, 1975.

This is a manual aimed at students, physicians and research workers.

Smith, D.W. and Wilson, A.A. The Child With Down's Syndrome (Mongolism): Causes, Characteristics and Acceptance for Parents, Physicians and Persons Concerned With His Education and Care. W.B. Saunders Company, W. Washington Square, Philadelphia, PA 19105, 1973.

This book covers the causes, characteristics, and acceptance for parents, physicians, and persons concerned with his education and care and expectations for the Down's Syndrome person.

Stedman, D.J. and Olley, J.G. Bibliography of the World's Clinical and Research Literature on Down's Syndrome: Behavioral, Social and Educational Studies Through 1968. Vol. VI (2). George Peabody College for Teachers: Institute on Mental Retardation and Intellectual Development, Nashville, TN.

Stimson, C.W. Understanding the Mongoloid Child. Today's Revell Company, 316 Third Avenue, Westwood, NJ 07675.

This pamphlet presents basic information on the Down's Syndrome child.

Superintendent of Documents. Mongolism - Hope Through Research. Washington, DC 20402.

This pamphlet provides basic information on Down's Syndrome.

Malpass, L.F. Motor skill in mental deficiency. In N.R. Ellis (Ed.), Handbook of Mental Deficiency. New York, NY: McGraw-Hill, 1963.

General information on the motor development of individuals with Mental Retardation is presented.

Penrose, L.S., and Smith, G.F. Down's Anomaly. Boston, MA: Little, Brown and Company, 1966.

Basic information related to Down Syndrome is presented.

G-3. Books in the Area of Physical Education:

Arena, J.I. Teaching Through Sensory-Motor Experiences. San Rafael, CA: Academic Therapy Publicators, 1969.

General text on sensory-motor development which includes numerous activities. Some of the chapters are devoted to hand-eye coordination, lateriality, and body image.

Cochran, N.A., Wilkinson, L.C. and Furlow, J.J. Learning on the Move. Dubuque, IA: Kendall/Hunt Publishing Company, 1975.

This is an activity guide for pre-school parents and teachers. The objective of this guide is to help to develop the maximum learning potential of children through physical activity.

Cratty, B.J. Development Through Action. Anaheim, CA: Skill Development Equipment Company, 1973.

The manual provides various gross motor activities for early childhood development which requires equipment.

Early, G.H. Perceptual Training in the Curriculum. Columbus, OH: Charles E. Merrill Publishing, 1969.

This text incorporates perceptual training into the school curriculum. Some of the topics relate to perceptual motor training with social studies, language arts, science, and industrial arts.

Flinchum. B.M. Motor Development in Early Childhood. St. Louis, MO: The C.V. Mosby Company, 1975.

This text offers a general review of motor development and readiness of the young child, explores the learning and developmental theories used in early childhood education, offers instructional approaches for using movement as a learning modality, and suggests educational implications which can be ascertained from motor activities and movement learning.

Frostig, M. and Maslow, P. Frostig MGL Move, Grow, Learn Movement Education Activities. Chicago, IL: Follett Education Corporation, 1969.

A card packet of approximately 100 activities. The activities are divided into seven categories: body awareness, coordination, agility, strength, flexibility, balance, and creative movement. A Teacher's Guide accompanies the card packet.

Gallahue, D.L. and Meadows, W.J. Let's Move. (2nd Ed.). Dubuque, IA: Kendall/Hunt Publishing Company, 1979.

A brief manual that provides information related to implementing a physical education program at the elementary school level. Some of the chapters cover games and sports, rhythms and dances, and educational gymnastics.

Kirchner, G. Physical Education for Elementary School Children. (4th Ed.) Dubuque, IA: Wm. C. Brown Company, Publishers, 1978.

Excellent text for an elementary school classroom or physical education teacher. The major sections of this text are foundation of physical education, nature and analysis of movement, physical education curriculum, game activities, gymnastic activities, and dance activities.

Miller, A.G., Cheffers, J.T.F. and Whitcomb, V. Physical Education. Prentice-Hall, 1974.

This book is designed for elementary classrooms and physical education teachers. Some of the topics discussed are individual and partner activities, elementary gymnastics, track and field, swimming, team sports, and dance activities.

Nagel, C. Play Activities for Elementary Grades. (2nd Ed.) St. Louis, MO: The C.V. Mosby Company, 1964.

This manual is a collection of games, relays, stunt plays, and fitness tests for elementary children.

Schurr, E.L. Movement Experiences for Children: A Humanistic Approach to Elementary School Physical Education. (3rd Ed.) Englewood Cliffs, NJ: Prentice-Hall, Inc. 1980.

A complete text in the area of elementary school physical education. The major sections of the text are physical education in the elementary school, understanding and fulfilling the needs of children, the curriculum, teaching-learning process, foundations of movement, and movement experiences.

G-4. Books and Pamphlets in the Area of Special Physical Education:

American Alliance for Health, Physical Education, and Recreation. A Guide for Programs in Recreation and Physical Education for the Mentally Retarded. 1201 Sixteenth, N.W. Washington, DC, 1968.

This guide was developed to stimulate thought and to provide ideas and suggestions of what might be included in a comprehensive recreation and physical education program for the mentally retarded.

American Alliance of Health, Physical Education, and Recreation. Programming for the Mentally Retarded. Report of a National Conference. October 31-November 2, 1966.

The papers of this proceedings focus on leadership preparation, research, program interpretation, and development of materials in the area of physical education and recreation for the mentally retarded.

American Association for Health, Physical Education and Recreation. Physical Activities for the Mentally Retarded. Washington, DC, 1968.

A practical answer to concerns for recreation and physical education for the mentally retarded and designed for use by physical education instructors of the mentally retarded, classroom teachers, parents, recreation personnel, volunteers, and those involved in teacher preparation. The contents are limited to activities promoting fundamental motor development and the exploration of three general areas of skill: net, racket, and paddle activities, rolling, pushing, throwing, and catching activities, and striking and kicking activities.

American Association for Health, Physical Education and Recreation. Special Olympics. Washington, DC, 1972.

This manual was commissioned by the Kennedy Foundation to provide a handbook for volunteers who want to organize games team sports, and recreation for special chi dren on a year round basis. These programs can be conducted at institutions, schools, day camps, municipal playgrounds, swimming pools, or anywhere there is room to run, jump, or throw a ball.

Arnheim, D.D., Auxter, D. and Crowe, W.C. Principles and Methods of Adapted Physical Education. (3rd Ed.) St. Louis: The C.V. Mosby Company, 1977.

This book provides an overview of mental retardation and implications for physical education.

Arnheim, D.D. and Sinclair, W.A. (2nd Ed.) The Clumsy Child. St. Louis: The C.V. Mosby Company, 1979.

This book was written for the regular and special classroom teacher and the physical educator. Numerous activities are presented within the following categories: tension release, locomotion, balance, body and space perception, rhythm and temporal awareness, rebound and airborne activities, projective management, selected play skills, and aggression management.

Beter, T.R. and Cragin, W.E. The Mentally Retarded Child and His Motor Behavior: Practical Diagnosis and Movement Experiences. Springfield, IL: Charles C. Thomas, Publisher, 1972.

This book is designed for use by professionals and parents of mild, moderate or severely mentally retarded individuals. Some of the more pertinent areas covered are movement experiences designed to develop perceptual-motor efficiency and social behavior through sports, rhythms, and games.

Bruininks, R.H. "Physical and Motor Development of Retarded Persons." In Ellis, N.R. (Ed.). International Review of Research in Mental Retardation. Vol. 7. New York, NY: Academic Press, 1974.

This chapter provides an excellent review of the literature related to the physical and motor development of retarded individuals.

Carlson, B.W. and Ginglend, D.R. Play Activities for the Retarded Child. Nashville, TN: Abingdon Press, 1961.

The book was designed to assist professionals and para-professionals in providing play activities that would aid the mentally retarded child in growing and learning.

Council for Exceptional Children. Recreation and Physical Activity for the Mentally Retarded. 1201 Sixteenth Street, N.W., Washington, DC.

This booklet is designed to provide physical educators, special educators, teachers, parents, and volunteers with minimal information to orient them to the problems they will face in the area of physical education and recreation for the mentally retarded.

Cratty, B.J. Motor Activity and the Education of Retardates. (2nd Ed.) Phildelphia, PA: Lea & Fibiger, 1974.

This text attempts to demonstrate how movement may aid a retarded child to function better with his family and in the classroom.

French, R. and Jansma, P. Special Physical Education, Columbus, Ohio: Charles C. Merrill, 1982.

One chapter in this text is directly related to physical education for individuals who are mentally retarded. In numerous chapters physical activities are presented.

Miller, A.G. and Sullivan, J.V. Teaching Physical Activities to Impaired Youth. New York, NY: John Wiley & Sons, 1982.

The emphasis in this text is techniques to mainstream handicapped individuals including those who are mentally retarded, into physical education.

Moran, J.M. and Kalakiah, L.H. Movement Experiences for the Mentally Retarded or Emotionally Disturbed Child. (2nd Ed.) Minniapolis, MN: Burgess Publishing Company, 1977.

This book given numerous meaningful movement activities for the mentally retarded and emotionally disturbed child.

Seaman, J.A. and DePauw, K.P. The New Adapted Physical Education: A Developmental Approach. Palo Alto, CA: Mayfield Publishing Company, 1982.

The developmental approach to physical education is utilized to program handicapped individuals, included those who are mentally retarded, in physical education.

Sherrill, C. Adapted Physical Education and Recreaction. (2nd Ed.) Dubuque, IA: Wm. C. Brown Company, Publisher.

This text offers a chapter related to mental retardation. The topics addressed are sensory-motor training, basic movement performance, fitness, rhythms and games, Special Olympics Program, AAHPER-Kennedy Foundation Special Fitness Test, and Fair Physical Fitness Battery for Mentally Retarded Children.

Wiseman, D.C. A Practical Approach to Adapted Physical Education. Reading, MA: Addison-Wesley Publishing Company, 1982.

In Chapter Nine, numerous physical activities are suggested for individuals who are mentally retarded.

G-5. Books and Pamphlets in the Area of Inexpensive and Home Made Physical Education Equipment:

Corbin, C.B. Inexpensive Equipment for Games, Play, and Physical Activities. Dubuque, IA: Wm. C. Brown Company, Publishers, 1973.

Fredrick, A.B. 212 Ideas for Making Low-Cost Physical Education Equipment. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1963.

Information and Research Utilization Center in Physical Education and Recreation for the Handicapped. Guide for Homemade Innovative Play Equipment for Activities in Physical Education for Impaired, Disabled, and Handicapped Participants. Washington, DC: American Alliance for Health, Physical Education, and Recreation, 1973.

Dr. Jack B. Share is a clinical and educational psychologist currently in private practice. His special interests are in Down Syndrome and in developmental disabilities. He has taught at various universities including the University of California at Los Angeles (UCLA) and Victoria University in We ington, New Zealand whe.e he gathered much of his data on the overall development of Down Syndrome children, over a three year period. He has also studied and worked in Mexico. He has published numerous articles on various aspects of Down Syndrome in the U.S. and abroad. He has also presented papers and workshops in Australia, New Zealand, Mexico, Venezuela, Spain and Israel. Dr. Share has collaborated closely with Dr. Richard Koch of Los Angeles Childrens Hospital. Together they have followed, longitudinally, a population of Down Syndrome children from birth to their teen years.

Dr. Ron French is presently an associate professor in the Department of Physical Education at the University of Utah. He was formerly the director of a federally funded grant for six years which included the training of students at tne Masters level in Special Physical Education and Therapeutic Recreation. He is a co-author of a text entitled "Special Physical Education" and has written several articles in the area of physical education for children with Down Syndrome.

To order, send check or money order to Dr. Jack B. Share, 13546 Riverside Drive, Sherman Oaks, CA 91423 or to Dr. Ronald French, Department of Physical Education, University of Utah, Salt Lake City, Utah 84112.

For information concerning seminars, workshops or presentations to interested groups, please contact either of the authors at the above address or by phone: Dr. Share, (213) 501-0895, Dr. French, (801) 581-7964.